
IN THE
Supreme Court of the United States
OCTOBER TERM 1975

No. **75-885**

DIAMOND INTERNATIONAL CORPORATION, *Petitioner,*

v.

MARYLAND FRESH EGGS, INC., *Respondent.*

PETITION FOR A WRIT OF CERTIORARI TO THE
UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

SUPPLEMENTAL APPENDICES "G" - "Q"
[Patent Copies and Photos]

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SUPPLEMENTAL APPENDICES "G" - "Q"

[Patent Copies and Photos]

INDEX TO APPENDICES

Page

**Note: Appendices A through F are bound in at end of Petition.
Appendices G through Q are bound in Supplemental
Appendix Volume.**

Appendix A—Opinion of the United States Court of Appeals for the Fourth Circuit, dated July 29, 1975	1a
Appendix B—Order of the Court of Appeals Denying Petition for Rehearing, dated September 23, 1975	14a
Appendix C—Opinion of the District Court in the instant case, dated April 25, 1975 ..	15a
Appendix D—Opinion of the District Court in Diamond International Corporation v. Walterhoefer, dated October 21, 1968	70a
Appendix E—Patent Office Board of Appeals Decision, dated February 1, 1961	141a
Appendix F—Pertinent text of Statutes involved	147a
Appendix G—Text of the Patent in suit	149a
Appendix H—Cox Patent No. 2,771,233	155a
Appendix I—Cox Patent No. 2,529,140	163a
Appendix J—Photo of Model of Cox 2,529,140	170a
Appendix K—Koppelman Patent No. 2,093,280 ...	172a
Appendix L—Photo of purported replica of Koppelman 2,093,280	177a
Appendix M—Tuttle Patent No. 117,349	178a
Appendix N—Hooper British Patent No. 406,150 ..	180a
Appendix O—Hunziker Patent No. 1,354,042	183a
Appendix P—Photo of Dolco's Specially made up box, without tying partitions, tested at Lawrenceville, Georgia	186a
Appendix Q—Snow Patent No. 3,398,875	187a

June 27, 1961

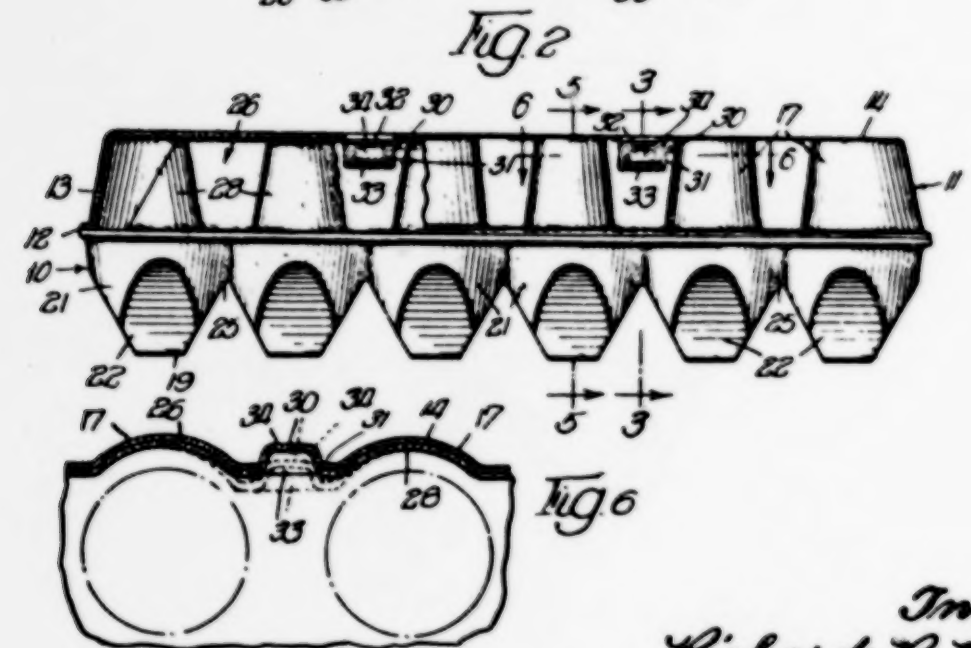
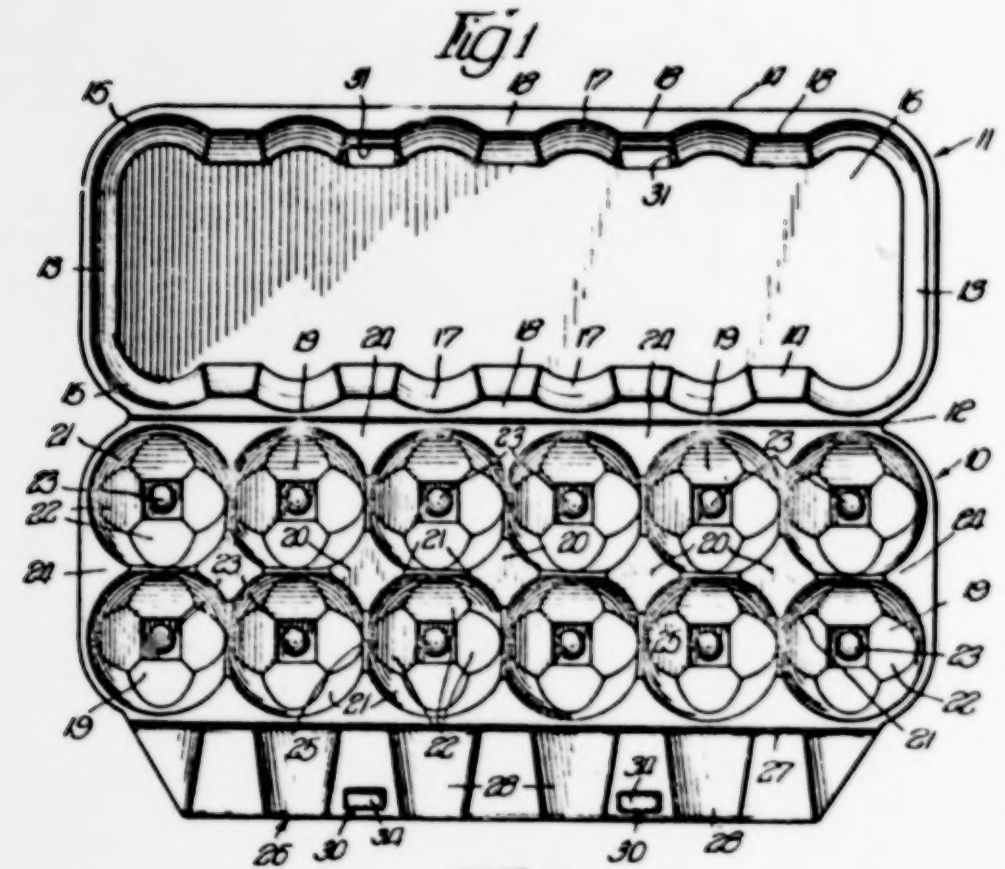
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2,990,094

MOLDED PULP EGG CARTON

Original Filed Dec. 16, 1953

2 Sheets-Sheet 1



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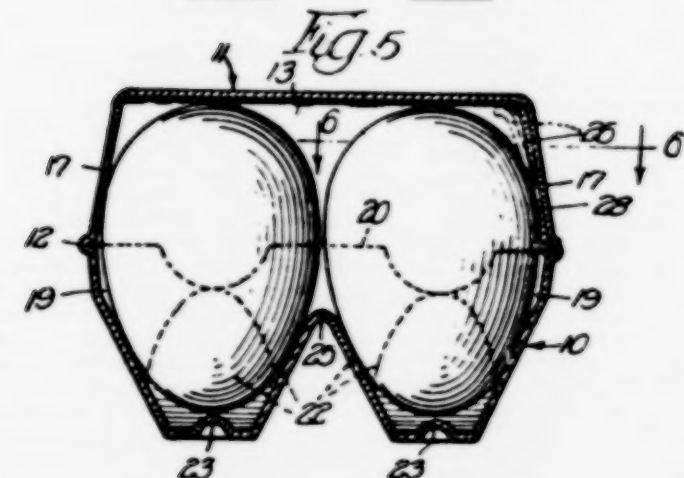
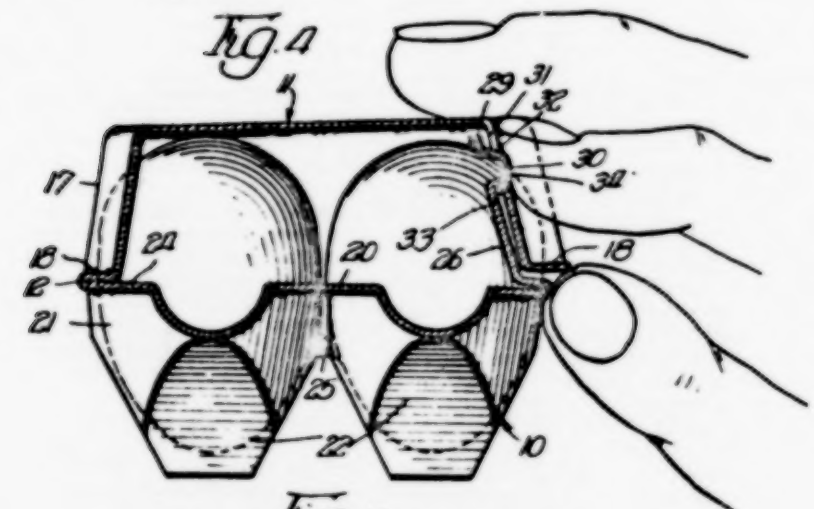
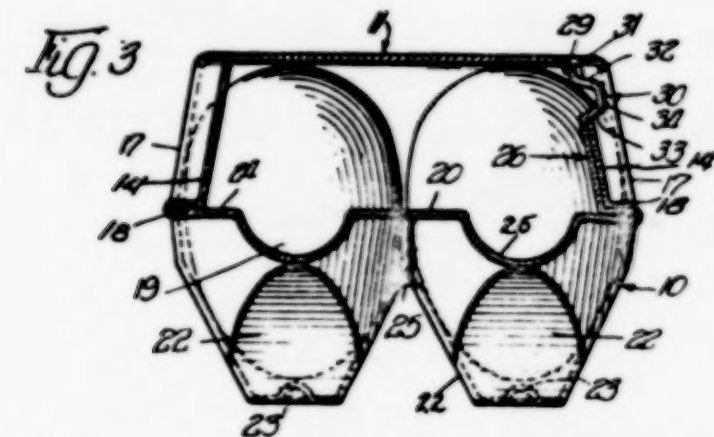
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1

2,990,094

MOLDED PULP EGG CARTON

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Continuation of abandoned application Ser. No. 398,475, Dec. 16, 1953. This application Apr. 19, 1957, Ser. No. 654,816

3 Claims. (Cl. 229-2.5)

The present invention pertains to improvements in a molded pulp egg carton and particularly to its integral means to releasably lock together the cover and bottom sections of the carton. This application is a continuation of my copending application Serial No. 398,475, filed December 16, 1953, now abandoned, which, in turn, is a continuation-in-part of my application Serial No. 289,727, filed May 24, 1952, now abandoned.

Locking provisions which are integrally built into the improved carton securely but releasably hold its cellular, egg receiving bottom section and its non-cellular, flat-topped, tray-like cover section in closed condition; and one of the main advantages of the improvement is that a very reliable locking action is had while still holding the longitudinal and transverse dimensions of the sections sufficiently small that 30 of the filled and closed cartons of the 2x6 style can be packed in a standard 30 dozen egg case. The locking provisions occasion no increase in the over-all dimensions of the carton.

A filled carton can be closed and locked without damaging its complement of eggs by simple automatic machinery operating at high speed; the strength of its integral lock far exceeds that afforded by any egg carton locking device now or previously on the market; and the carton is internally braced and rigidified by an integral, cell defining partition structure, whose rigidifying effect contributes materially to the efficacy and strength of the lock. Yet the locking provisions are conveniently accessible from the top and exterior of the carton for quick and easy unlocking, again without imposing crushing stress on the eggs. The locking elements have been devised with as much attention to their release as to their initial engagement.

Specifically, the invention provides a molded pulp egg carton featuring an internal cover bracing and locking flange which is integrally carried on a side margin of its cellular bottom section. The flange telescopes slidingly upwardly in the cover section of the carton as the cover is brought down toward the bottom section, finally assuming face to face engagement with a front wall of the cover. Externally projecting locking lugs are integrally molded in the flange, and the cover wall faced thereby has locking apertures molded therein to receive the locking elements under an inherent outward spring of the flange about its integral connection to the bottom.

A very rigid quality is imparted to the bottom section, notwithstanding the egg cushioning ability of its individual cells, by its integrally molded internal partitioning structure, which ties the section together as a rigid box-like unit. This structure stabilizes and stiffens an integral longitudinal hinge which connects the flange to the bottom section, with the result that a spring action of the flange about that hinge is made very pronounced. There is a streaming of the pulp fibers at the hinge as the flange is swung inwardly to upright condition which insures snap engagement of the flange locking lugs in the cover apertures when the flange is fully telescoped.

The locking apertures are so located in relation to a top panel of the cover, being closely adjacent the same, and the shapes of the locking flange and its lugs are such, as

2

to secure optimum efficiency in engaging and also in disengaging the lock.

The eggs are shielded by the upstanding bracing and locking flange as the carton sections engage and disengage, with the carton cover sliding over the outer face of the flange. The eggs have no function whatsoever in respect to the making or maintenance of the interlock between the flange lugs and cover apertures; hence, the lock is equally effective whether the carton is wholly or partially filled, or even when it is empty. It follows that the eggs are not subject to any wedging or crushing as the cover is closed over the flange and bottom, which would of course be extremely objectionable in a carton intended to be closed and locked by machinery.

In regard to the matter of disengaging or releasing the lock, the shape of the upstanding bracing and locking flange permits it to have side engagement with eggs in cells adjacent its hinge only at a zone slightly above their zone of maximum girth. This is true for even the largest size of eggs, or "jumbos," which can be housed in the carton. A substantial top space is left at the centers of the egg cells and between the flange and the upwardly receding curvatures of eggs in those cells, into which the flange can flex inwardly a substantial distance as its locking lugs are depressed to release the same. It is primarily the inherent hinged spring of the flange, not its abutment against the eggs in the cells, which resists release of the lugs; since there is no appreciable contact of the flange with the eggs at the vertical planes of the lugs themselves, which are between egg cells.

Inasmuch as the locking lugs are positioned adjacent the top of the flange, for reception in apertures adjacent the top of the cover, they are in a zone farthest spaced from the maximum curvatures of eggs in cells at either side thereof. It follows that there is a maximum free moment arm between each lug and adjacent egg, so that the lugs are disengaged with ease and convenience from the cover apertures in opening the carton.

The location of the locking apertures also bears on the procedure of molding the cartons. Being high in a front wall of a cover, i.e., adjacent its junction with the cover top panel, also assures that the molded carton will strip freely from a molding die. Since a plug in the molding screen is employed to form each aperture, the location of the latter at an intermediate point, height-wise of the flange, would cause the plug to interlock with the molded pulp fibers and prevent stripping. As constructed, the plug strips freely past the margin of the cover panel at the aperture.

Inasmuch as a strong snap action of the flange locking lugs, in springing into the apertures of the cover section wall, has been coupled in the improved carton with an adaptability of those lugs to be readily unlocked manually by the user, the invention furthers the attainment of this end by means of an improvement in the shaping of the lugs. They are contoured in the molding operation so that their lower surfaces merge downwardly at an appreciable angle to the horizontal into the remainder of the flange. This enables the lugs to cam themselves up over the lower surface of the cover wall aperture as they snap outwardly into the aperture. The effect, though slight, is that of urging the wall downwardly toward a closed position of the cover. Merging at a downward angle into the flange, the lugs will not be embedded by the bottom margin of the wall aperture, hence are freely depressed inwardly for unlocking.

The upper surface of each lug also angles, in this case upwardly, to a merger with the flange immediately adjacent its top, free edge. This assists the cover in sliding downwardly and over the lugs as the cover is plowed into closed position by the closing machine. In sliding

3

over the upper inclined surfaces of the lugs, the apertured free cover wall flexes outwardly, so that interference with the remainder of the free edge of the flange, as the cover continues its downward movement, is impossible.

The flexibility of the apertured and externally telescoped cover wall of course diminishes from a maximum at its free lower edge to a minimum adjacent its merger with the top. In offering maximum resistance to outward flexure at its topmost point, the wall resists to the greatest degree inadvertent displacement of a flange locking lug from its aperture as a result of accidental outward wall flexure. The stabilizing action of the braced bottom section on the flange hinge is also a contributing factor in this matter, since a laterally unrestrained hinge would compound the likelihood of an accidental unlocking of the lug upon flexure of the cover wall.

Another aspect of the bracing of the cellular bottom section by its integrally molded, upstanding longitudinal partition and cross partition structure is that this structure, as herein proposed, makes possible the over-all compactness of dimension of the improved carton. The bottom section is subdivided into rows of cells by continuous, longitudinally extending and integrally connected dividers, whose tops represent the approximate height of the cells. The dividers incline downwardly from the tops to intermediate zones at which successive cells are merged with one another by upwardly tapering lower wall portions. These portions are of substantially polygonal outline and joint upwardly into generally conical upper cell portions which are at a lesser angle to the vertical.

Successive cells are thus merged with one another at intermediate zones, in reference to the horizontal dimensions of the cells, and at an intermediate elevation which is approximately midway of the height of the cells. Each carton cell thus provides the necessary egg supporting cushion, at its upwardly tapered lower portion, for the smaller end of eggs disposed therein, and the eggs are laterally and longitudinally restrained and separated by the upper portions at the approximate maximum egg girth; yet the eggs are brought as close together as possible without actual contacts.

All of these factors compact the closed carton so that it can be packed in a standard 30 dozen egg case, and still the design of the locking flange in relation to the non-cellular carton cover permits the flange and its locking lugs to freely flex inwardly in locking and unlocking, without in either case imposing any crushing stress on even the largest sizes of eggs which can be placed in a row of cells adjacent the flange.

The foregoing statements are indicative in a general way of the nature of the invention. Other and more specific objects will be apparent to those skilled in the art upon a full understanding of the construction and operation of the improved carton and its locking features.

A single embodiment of the invention is presented herein for purpose of illustration. However, the invention may be incorporated in other modified forms coming equally within the scope of the appended claims.

In the drawings:

FIG. 1 is a top plan view of a finished molded pulp carton in the open, generally planar condition thereof as stripped from molding and drying dies, showing the highly compact nature of the carton;

FIG. 2 is a view in front elevation of the improved carton in closed and locked condition, being partially broken away to more clearly illustrate the character and action of the automatic internal locking flange and lugs thereof;

FIG. 3 is a view in transverse vertical section of the closed and locked carton along a line corresponding to line 3—3 of FIG. 2, which is in the vertical plane of a locked flange lug and cover aperture, showing the final relationship of the locking lug and aperture to one another and indicating the relationship of these features to a large size egg just behind them;

4

FIG. 4 is a view in transverse vertical section similar to FIG. 3, showing the simple manner of manipulating the carton to disengage the flange locking lugs;

FIG. 5 is a view in transverse vertical section along line 5—5 of FIG. 2, i.e., in a vertical plane through egg cell centers, illustrating the top clearance which the improved carton affords at this occupied zone for inward flexure of its bracing and locking flange; and

FIG. 6 is a fragmentary view in horizontal section along line 6—6 of FIGS. 2 and 5, showing in solid and dotted line how the carton permits inward flange flexure in disengaging its lock.

The illustrated carton, shown in FIG. 1 in its flat condition as stripped from a drying form, comprises a cellular, pronouncedly compartmented bottom section, generally designated 10, to which a non-cellular or open faced, tray-like cover section 11 is integrally hinged by a longitudinal crease 12 at corresponding side margins of the sections. Cover section 11 has pairs of opposed end walls 13 and side walls 14 integrally joined by rounded corners 15, and a flat top panel 16 is likewise integrally joined about its periphery with the walls. The exterior surface of this panel is smooth and continuous, well suited for the reception of printed matter or ornamentation.

Cover section side walls 14 are of scalloped shape, featuring longitudinally spaced, outwardly curved or recessed bays 17 formed by frusto-conical sectional surfaces molded in the front wall 14 of the cover section to increase the egg room in the cover section above the egg cells of the bottom section, which recesses are spaced by intervening, inwardly extending abutment portions 18. These have stable vertical engagement with cellular bottom section 10 when the carton is closed.

The interior of bottom section 10 is partially subdivided into two rows of six egg receiving cells 19, in the type of carton chosen for illustration, by a longitudinally extending series of upstanding center separator posts 20 which are of generally rectangular outline at their tops. Their sides merge downwardly in a concave shape, as at 21, and at an angle to the vertical, into flat lower cell walls 22 which are arranged in rectangular outline. The floor of each cell 19 has a convexly rounded cushion button 23 molded therein which will afford a yieldable support for a relatively small egg. However, the primary cushioned vertical support is at the flat divergent wall surfaces 22. Spaced, inwardly extending side and end abutment webs 24 along the respective side and end walls 13, 14 of bottom section 10 complete the cellular partition structure of the latter. They have generally conical, upper and flat, lower cell defining surfaces which merge beneath the cell tops in like manner to the surfaces 21, 22 of central posts 20. The cells 19 are contiguous in their longitudinal and transverse arrangements. That is, the intended spacing of the bottoms of successive cells brings them so close to one another that adjacent, upwardly tapering flat surfaces 23 meet well below the top of the cells, in fact at an elevation a little more than midway of the cell height, as appears in FIG. 3. This is true of any pair of successive cells whether arranged transversely of the carton or in one of its longitudinal rows.

The merger of successive contiguous cells occurs approximately at, and not below, the elevation at which the respective sets of lower flat surfaces 23 merge upwardly into the conical surfaces 21. The result is that downwardly curved intermediate ridges or saddle-shaped portions 25 integrally connect successive posts 20 with one another, in the longitudinal direction, and integrally connect each post with abutment ledges 24 on either side thereof, in the transverse direction. These depressed connections are of slight width, their cross section representing a somewhat thickened apex of the upwardly convergent surfaces 23, and they are concavely curved in their transverse contour. Thus eggs in successive cells are brought as close together as possible, for the larger

5

size, yet they are safely protected against contact by the upwardly tapered cell dividers 25 and posts 20. The conical upper surfaces 21 of the posts 20 and side and end abutments 24 cradle the maximum girth of the eggs, restraining them from contact and holding them from rolling when the carton is open.

In practice it has been found best to taper the lowermost flat cell surfaces 23 at an angle of about 28° to the vertical, with the upper conical surfaces at a substantially lesser angle, as shown in FIG. 5. This gives best cushioned egg support at surfaces 23 and best horizontal egg restraint at its zone of approximately maximum girth.

Thus, the improved carton presents a cellular bottom section 10 made up of cells which are contiguous well beneath the tops and above the bottoms thereof. This means the maximum compacting of the over-all longitudinal and transverse dimensions of the carton as a whole, which will enable the cells to accommodate large size eggs without their destructive contact with one another and to hold the eggs against excessive tilt or shift. The partitioning means extend integrally from end to end and side to side of the carton, substantially rigidifying the same as a result.

An elongated internal cover bracing and locking flap or flange 26 is integrally hinged by a longitudinally extending crease 27 to the side margin of bottom section 10 opposite its cover hinge 12. Flange 26, like the side walls of cover section 11, is of generally scalloped outline. It has egg accommodating bays or recesses 28 formed by frusto-conical sectional surfaces molded therein which are in transverse alignment with the bottom section egg cells 19 and intervening, inwardly projecting abutments 29 which are transversely aligned with the side abutments 24 of the bottom. Flange 26 and the front or free unhinged wall of the cover 11 carry the locking provisions of the carton.

The locking means comprises a pair of locking elements or lugs 30 which are integrally molded in the flange 26 to project outwardly adjacent the free outer edge thereof, and detent apertures 31 molded in the front wall 14 immediately adjacent its junction with cover top panel 16. The lugs and apertures are of substantial width in order to take strong and true (resistant) engagement when the carton is locked. The lugs are characterized by upper and lower surfaces 32, 33, respectively which angle divergently and merge with the remainder of flange 26 above and below the lugs. A rounded nose 34 connects lug surfaces 32, 33.

The locking apertures 31 extend upwardly from an intermediate point in the height of cover front wall 14 to its junction with the top panel 16 of the cover section, as illustrated in FIGS. 2, 3 and 4. Locking and bracing flange 26 is of a height to also extend to this panel, being in edge abutting and vertically bracing engagement with the latter, as well as in internal, side by side contact with the inner surface of the apertured cover front wall when the carton is closed and locked, as in FIG. 3. However, it should be noted that in this condition the flange is readily flexible inwardly to disengage the lock as an inspection of FIGS. 5 and 6 will reveal and as will be hereinafter explained in detail. FIG. 6, which depicts in dot-dash line the shape or outline of eggs at the elevation at which the section is taken, shows the substantial space between the eggs and the flange which permits freedom of inward flange flexure.

In using the carton eggs are deposited, large end up, in bottom section cells 19, whereupon flange 26 is swung to upstanding position adjacent the front row of eggs and the cover section 11 is swung downwardly into externally telescoped relation over the flange. These operations are ideally performed on high speed closing apparatus adapted to plow the flange and cover inwardly about their hinges and swing the cover down. As this happens, the free front cover wall 14 slides downwardly over the upper inclined camming surface 32 of the flange

6

locking lugs 30, flexing the wall outwardly so that it is unnecessary to exert special precautions to cause the cover to clear the flange. When the lower edge of each wall aperture 31 passes the nose 34 of its locking lug the latter snaps outwardly under the inherent spring of flange 26 to a positively interlocked relationship in the aperture. The lower inclined surface 33 of the lug facilitates its entry into the aperture without snagging, and the inclination even exerts some cam action on the cover wall to urge it further down as the wall returns inwardly.

Flange 26 is in edge abutting, load sustaining relation to cover top panel 16 when the cover is fully closed, and its inherent outward spring urges it outwardly to maintain this strut relationship to the cover and to resist accidental inward displacement of lugs 30 from apertures 31. The lock has been completed without the necessity of jamming flange 26 inwardly under substantial force which would be apt to crush the eggs.

In order to unlock the cover, lugs 30 are pressed inwardly in the fashion illustrated in FIG. 4, preferably placing the thumbs beneath locked cover section wall 14 and the index fingers in engagement with the lugs, with the other fingers of the hands resting on top panel 16 as a fulcrum for an outward stretching of wall 14 and upward lift of wall 14 as the lugs 30 are depressed inwardly. Inward springing of flange 26 which necessarily attends the depression of the lugs is facilitated due to the arrangement of the latter in a top portion of the flange, immediately adjacent its free upper edge. See FIGS. 5 and 6.

By reference to FIGS. 5 and 6, it is seen that there is a substantial space between the upper part of the flange and the receding upper curvature of an egg to permit ready inward flexure of the flange. The most restricted space is at the longitudinal center of an egg cell, a zone depicted in FIG. 5, and it is there indicated in dotted line how the flange 26 can flex inwardly at its top to accommodate inward shift of its lug in a zone to one side of the egg. The egg will not ordinarily be engaged by the flange at an elevation even as much as midway of the height of the cover section 11. There is a maximum moment arm between the lug 30 and this point of egg-flange engagement for inward yielding of the flange and unlocking of the carton.

There is no possibility of damaging an egg in unlocking. The lugs are conveniently accessible to the fingers with the carton in upright position, and when the cover is opened the eggs are held in place against roll or shift by their individual, relatively high walled cells.

The non-cellular cover section 11 will of course permit some degree of rearward tilt of large sized eggs, if necessary, in flexing flange 26 between egg cells to close or open the carton, so that in no case do the eggs themselves act as an abutment primarily holding lugs 30 in apertures 31. This will inevitably cause egg breakage. It is the spring of the flange at its stiffly stabilized hinge, coupled with its top flexibility, which are the key to the maintenance of the lock and to its ready disengagement when desired. The partitions which compartmentize bottom section 10 tie its two longitudinal hinge-bearing walls together in a rigid relationship.

In short, as regards flexibility, the bottom section 10 progresses upwardly from a practically inflexible perimeter, rendered so by its elevated, internally molded partitioning in integral merger with its walls, past the flange hinge and into the locking flange 26. The latter decreases in its resistance to local flexure from maximum at a lower portion adjoining the hinge, which determines the flexibility or snap of the flange as a whole, to an upper free edge which is of maximum local flexibility, as about any upright fulcrum.

The reverse is true in reference to the outer free wall 14 of cover section 11. Its yieldability to outward flexure increases from a zero or minimum at its junction with top panel 16 to a maximum at its lower free edge. This

2,990,094

7

means that since locking apertures 31 are located at a zone of minimum flexibility they will have best locking stability in holding lugs 30; the lower part of the wall can still flex outwardly for ease of camming engagement of the lock lugs, and for disengaging them manually, when desired.

Locking lugs 30 can be made wide and rugged, for example of a width substantially exceeding that of the intermediate transverse space in the cover 11 to permit their rearward flexure.

The carton is capable of repeated re-use without noticeable diminution of the effectiveness of its locking provisions, which are so devised that minimum stress is placed on lugs 30, but even so the reinforced shaping of the lugs makes them well able to take any shearing stress they may encounter. The carton obviously consumes a minimum of molded pulp paper for a self-locked type. The improved lock requires no special operation to engage it beyond a normal manipulation of the carton parts into closed position. Special lock interengaging procedures are avoided. Hence, there is no need, in a large scale egg room operation, for complicated or special closing machinery. From another equipment aspect, the locking lugs 30 and detent apertures 31 are all formed incident to a normal pulp molding procedure, not increasing in any degree the time or technical difficulties involved in making the carton.

The advantages of egg cartons embodying the invention have been described with particular reference to large scale egg packaging operations involving automatic machinery for closing and sealing the cartons. The simplicity of construction and the outstanding ease of operation of the locking mechanism also makes these cartons attractive and highly convenient for ordinary housewives. Unlike the egg cartons available heretofore, it is unnecessary for the housewife to place the carton on a support and then use both hands in order to unlock and open it. Instead, it is possible for her to hold the carton in one hand while quickly and easily unlocking and opening the carton with her other hand, in the manner described hereinbefore relative to FIG. 4 of the drawings. Furthermore, the readily and smoothly operable positive locking mechanism enables the housewife to perform these operations without jerking or straining the carton in any way, thereby greatly minimizing the danger of dropping and breaking the eggs.

In the single embodiment of the invention illustrated and described in detail, the egg carton is provided with two rows of six egg cells each, which is known as a two by six type carton. However, it is evident that the invention may be embodied advantageously in other types of cartons, such as the widely used three by four type egg carton. Furthermore, although it is highly desirable for the cover front wall 14 and the flange 26 to have mating scalloped configurations, it is also contemplated that these portions of the carton may be made perfectly flat. Likewise, although a preferred type of egg cell structure has been illustrated and described, it should be understood that other suitable types of cell structure may be employed in cartons embodying the invention, if desired, and that the cells may be adapted to contain fruit or other generally spherical objects instead of eggs.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit of the invention and therefore the invention is not limited to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. In an integral and nestable egg carton made of relatively flexible molded pulp, a cellular tray portion having a front side, a rear side, and two ends, an inverted

8

dished cover hinged to said tray portion, means for latching said tray portion to said cover with a latch located above said tray portion and extending completely through said cover from the inside to the outside, said tray portion having its front side strongly tied to its rear side by a plurality of spaced cell-forming partitions extending generally parallel to said tray portion ends, said partitions acting as means for preventing spreading of said front side from said rear side, said tray portion including egg cells adjacent but below the latching means, said inverted dished cover having a planar top, a front side, a rear side, and two ends, said front side being connected to said rear side only by said two ends and said planar top so that the front side is relatively flexible and is not rigidly tied to said rear side intermediate the ends of said front side, said front side of said cover having an opening formed therein through which the latch is adapted to extend completely from the inside to the outside, said dished cover being hinged to said tray portion along its rear side, a latch holding flap hinged to the front side of said tray portion, the hinge line connection of said cover with said tray portion and the hinge line connection of said latch holding flap with said tray portion being maintained parallel by said tying partitions even when the tray portion is loaded with eggs, said latch on said latch holding flap being located on one side of said tray portion which is opposite to the side where the cover is connected to the tray portion so that both the cover and the latch holding flap are each connected to the tray portion when the carton is open, said molded pulp egg carton being integrally formed with the latch holding flap, the upper edges of the two sides and the two ends of the tray portion, the upper edges of the two sides and two ends of the cover generally in the same plane and with the latch extending downwardly from the underside of the latch holding flap which is hinged to the front side of the tray portion and said latch being relatively close to the tray portion as compared with the opening in the front side of the cover which is relatively remote from the tray portion; when the tray portion is loaded with eggs and the latch holding flap is turned upwardly and the cover portion is rotated in a direction to telescope over the latch holding flap, the two hinge lines are relatively immovable but the front side of the cover may flex, whereby the loaded egg carton may be latched by simply rotating the latch holding flap upwardly and inwardly and rotating the cover upwardly and around the latch holding flap while the structural features maintain the geometric relation of the latch on the latch holding flap to the opening in the cover until the front side of the cover engages the latch on the latch holding flap and is cammed thereover until the latch on the latch holding flap registers with the opening in the front side of the cover whereupon the latch passes through the opening in the cover from the inside to the outside to effectively latch the carton.

2. A nestable molded pulp egg carton in accordance with claim 1, wherein the opening in the front side wall of said cover extends to the planar portion thereof and the latch on said latch holding flap is near the edge thereof which is remote from the hinge connection of the latch holding flap with the tray portion.

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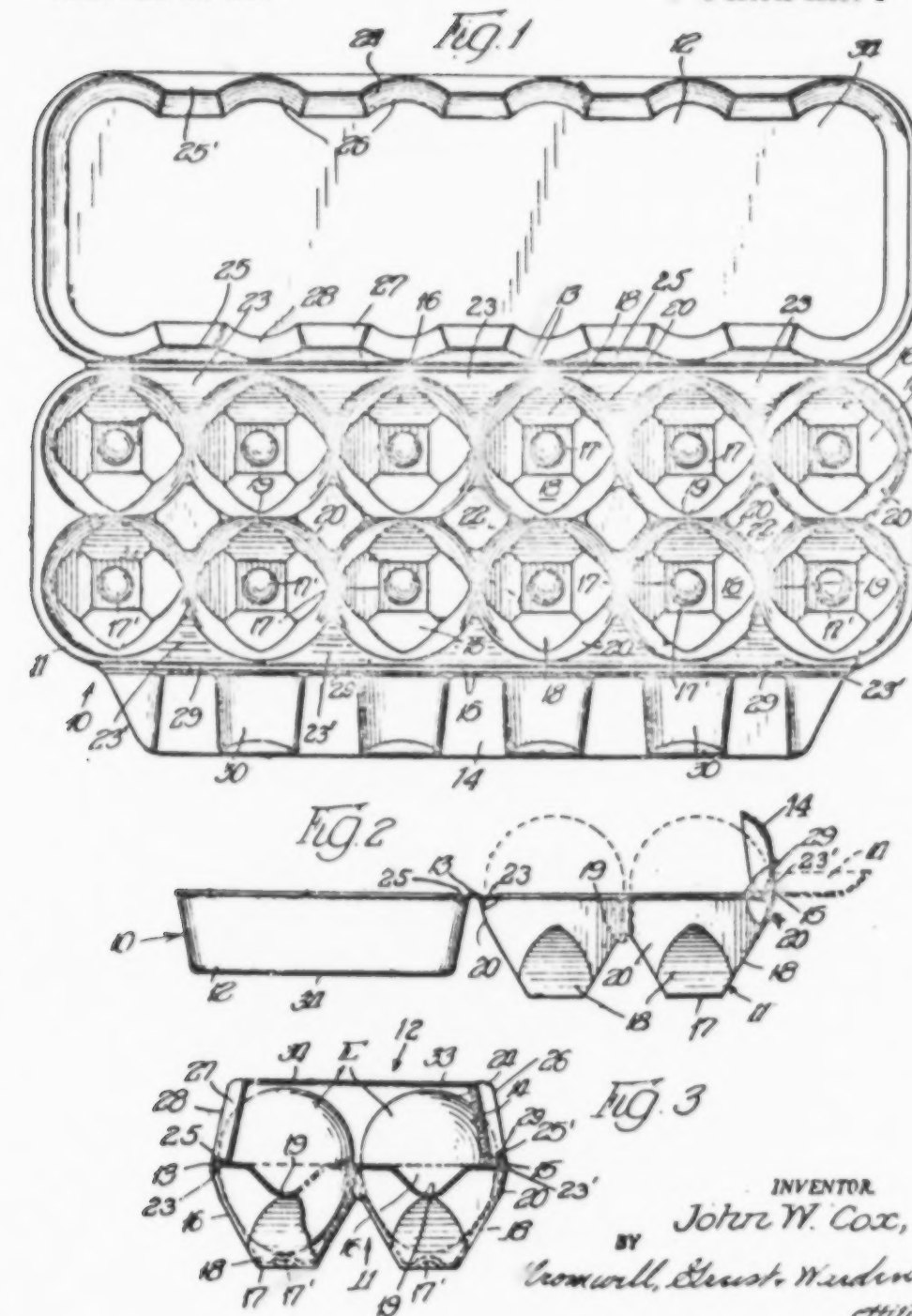
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MOLDED PULP CARTON

Filed June 21, 1950

3 Sheets-Sheet 1



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2,771,233

MOLDED PULP CARTON

Filed June 21, 1950

3 Sheets-Sheet 2

Fig. 4

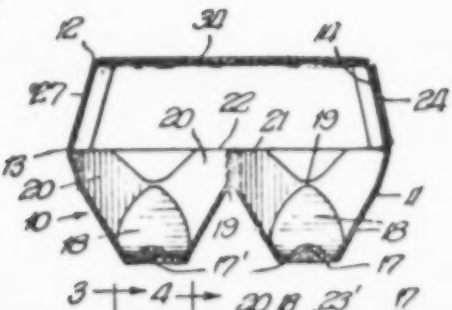


Fig. 5

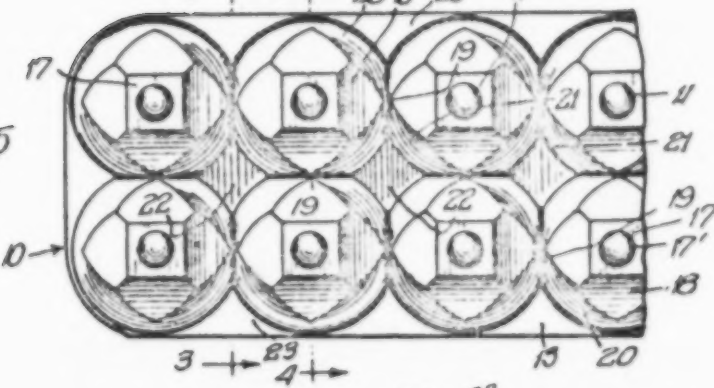
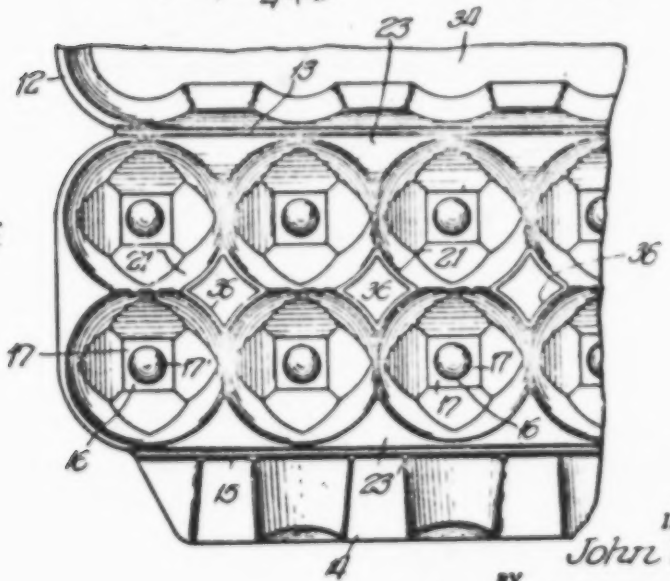


Fig. 6



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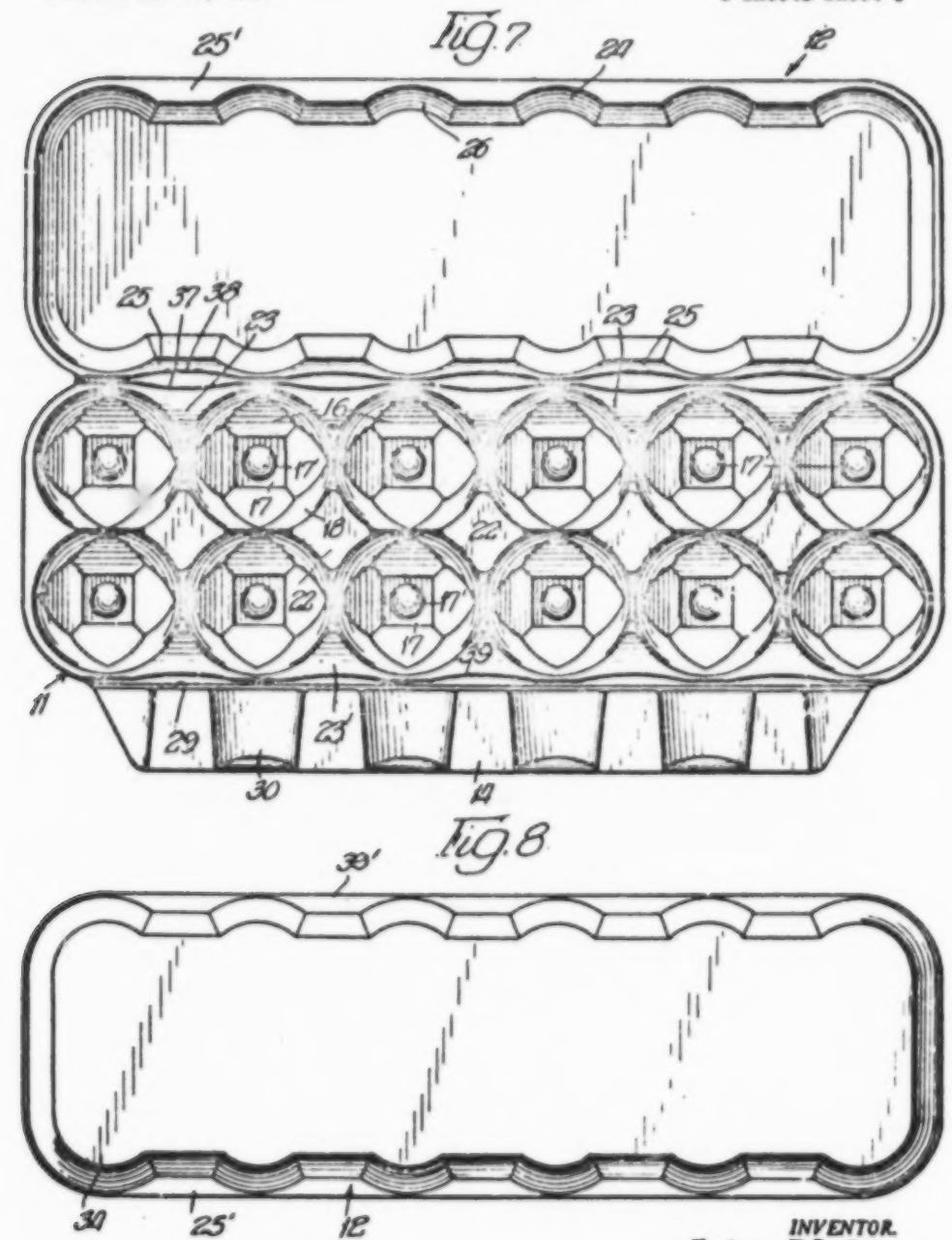
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J. W. COX
MOLDED PULP CARTON

2,771,233

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3 Sheets-Sheet 3



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2,771,233

MOLDED PULP CARTON

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20 Claims. (Cl. 229-1.5)

The present invention pertains to molded paper pulp egg cartons. More particularly, it concerns certain structural improvements in a carton of this type whereby large size eggs are effectively cushioned and supported in the lower of two integrally hinged sections of the carton without objectionably increasing the over-all carton size, and whereby the two sections of the carton are effectively braced by one another, in the closed condition thereof.

It is a general object of the invention to provide an egg carton fabricated from molded paper pulp and including non-cellular cover and cellular bottom sections integrally connected to one another by a hinge extending along a margin thereof, in which both sections are provided with abutments adjacent and extending along the hinge, which abutments are specially shaped with relation to the hinge, thereby to insure positive engagement thereof in the closed condition of the carton so as to support the cover against telescoping relative to the bottom section under vertical crushing load.

Another more specific object of the invention is to provide a molded pulp carton characterized by a hinge integrally connecting the carton sections and occupying appreciable vertical space in the closed condition of the sections, in which special, oppositely inclined abutments are provided on the respective sections, extending adjacent and along the hinge, to positively support the cover on the bottom section notwithstanding the special, vertically extending character of the hinge, which would prevent such positive support, unless compensated.

A further specific object is to provide a carton of the above sort in which the abutments on the bottom section are located between successive egg receiving cells thereof adjoining the hinge and coact with similar abutments on the non-cellular cover section.

Yet another specific object of the invention is to provide an improved molded pulp egg carton in which the cells of the bottom carton section feature a polygonal-walled lower portion and a generally conical upper portion merging with the walls of the lower portion at a lesser angle to the vertical than the latter, thereby to insure effective cushioning of large size eggs in the cells while minimizing the size of the cells at the top thereof, and as a result enabling the over-all transverse and longitudinal dimensions of the carton to be kept at a minimum.

Another object of the invention is to provide a molded pulp egg carton of 2 x 6 egg arrangement adapted to be packed, in the manner of 2 x 6 paperboard egg cartons, in a standard 30-dozen capacity egg case or crate, and characterized by a bottom section subdivided into two rows of six egg receiving cells each of which has a polygonal-walled lower portion merging into a generally conical upper portion as described above, to the end that the outside dimensions of the carton are kept within limits which enable packing in a crate of the type referred to, while at the same time affording sufficient egg space in each of the cells to receive large size eggs and to cushion the same most effectively at the polygonal lower portion thereof.

2

A still further object of the invention is to provide a molded paper pulp carton of the type referred to including a cellular bottom section, a non-cellular cover section hinged thereto, and a reinforcing or bracing flange or equivalent member integrally hinged to a margin of the bottom section opposite that along which the cover section is hinged, the respective sections and flange member being provided with special coacting, mutually inclined abutment surfaces adjoining the respective hinges thereof which insure positive abutting engagement of the hinged parts in the closed condition of the carton, with the flange disposed internally of the cover section and in supporting engagement therewith.

Another specific object is to provide a carton construction of the type referred to above, wherein the internal flange is specially shaped to provide the abutting engagement with the bottom section, as referred to, and furthermore to provide external abutments which are vertically engaged by the cover section, to the end that the cover section shall be vertically braced and supported positively in at least three zones when in closed position.

It is a general object of the invention to provide a molded paper pulp egg carton referred to in the preceding paragraphs, which carton is of 2 x 6 egg receiving capacity and features a special cell formation of its bottom section in the interest of insuring adequate egg space, optimum bottom cushioning of the eggs, and maintenance of the external carton dimensions within a predetermined minimum, yet which is very strongly braced against relative lateral shifting and vertical telescoping of its hinged sections without recourse to the use of internal abutments on the non-cellular cover section thereof, thereby preserving a planar top surface on the latter which is suited for printing or ornamentation.

The foregoing statements are indicative in a general way of the nature of the invention. Other and more specific objects will be apparent to those skilled in the art upon a full understanding of the construction and operation of the device.

Two embodiments of the invention are presented herein for purpose of illustration, and it will be appreciated that the invention is susceptible of incorporation in other modified forms coming equally within the scope of the appended claims.

In the drawings,

Fig. 1 is a top plan view of the improved molded paper pulp egg carton, showing the same in the open condition thereof as stripped from a drying form;

Fig. 2 is an end view of the carton, with an internal bracing flange thereof shown in dotted lines in its original position and in solid lines in its upwardly swung operative position, the figure being partially broken away and in vertical transverse section to illustrate details of its cover and flange hinge construction;

Fig. 3 is a view in transverse vertical section along a line corresponding to line 3-3 of Fig. 5, further illustrating the improved provisions of the invention for compensating for the height of the respective hinges which connect the cover section internal flange to the bottom section of the carton;

Fig. 4 is a view in vertical cross section along line 4-4 of Fig. 5, illustrating the hinge structure at a different position longitudinally of the carton;

Fig. 5 is a fragmentary bottom plan view of the closed carton;

Fig. 6 is a fragmentary top plan view of an open carton in accordance with a modified embodiment of the invention;

Fig. 7 is a plan view similar to Fig. 1, showing a modified carton having special cover and flange hinging provisions for the purpose of preserving lateral compactness of the closed carton; and

Fig. 8 is a top plan view of the carton of Fig. 7 in its closed position.

Generally considered, this invention affords an improved molded pulp egg carton of 2 x 6 egg capacity, a type which is commercially attractive because of the low cost of production thereof but which has heretofore resisted successful exploitation, at least to the extent received by the better known, 3 x 4 capacity, externally flanged molded carton made in accordance with the patent to Sherman 1,975,129. This is due to an inherent difficulty of providing adequate egg receiving space in the 2 x 6 type without exceeding certain minimum external dimensions which permit the carton to be packed in a standard 30-dozen capacity egg crate or case. Likewise, an adequate support of a non-cellular carton cover over the cellular bottom thereof to resist crushing or telescoping under load is difficult to attain without resorting to the use of molded internal cover abutments. These preclude the printing or ornamentation of the exposed top panel of the cover.

Referring to the drawings, the carton is generally designated by the reference numeral 10. It comprises a cellular bottom section 11, a non-cellular or open, tray-like cover section 12 which is integrally connected to the bottom section by a special, double creased hinge 13 and an internal cover bracing flap or flange 14 which is integrally hinged to the bottom section 11 by a double creased hinge 15 similar to hinge 13. This carton is molded from a paper pulp slurry and is dried and stripped from drying forms in the flat condition illustrated in Figs. 1 and 2, with cover section 12 and flange 14 extending horizontally from the respective hinges 13, 15.

The bottom section 11 is molded to provide a plurality of like egg receiving cells 16 arranged in two parallel rows of six each, the cells of the respective rows being in lateral or sidewise alignment transversely of the carton length. The sectional outline of the individual cells is one of the improved features of the invention, since it provides maximum egg receiving space in a cell of minimum over-all width, coupled with optimum egg cushioning action. By maintaining control of individual cell dimension the over-all dimensions of the entire bottom section 11 are restricted sufficiently to enable the filled and closed carton to be satisfactorily packed in a standard 30-dozen egg case.

Referring to Figs. 1, 4 and 5, the cells 16 have flat square bottoms 17, from the sides of which the lower wall portions 18 incline upwardly and outwardly at a predetermined angle to the vertical, thereby providing a generally polygonal lower egg cushioning portion. Bottoms 17 preferably have an upwardly extending, bubble-like cushion 17' lying just below the level at which the lower ends of all but very thin eggs are received. The lower walls 18 may be concaved, if desired, to improve the cushioning action. The wall portions 18 of adjacent cells merge upwardly with one another along crests 19 which are spaced substantially beneath the tops of the cells, as illustrated in Fig. 4, the tops of which cells coincide with the horizontal meeting line of the closed sections. The polygonal lower wall portions 18 merge upwardly with rounded, generally conical, upper cell portions 20. These are at a lesser angle to the vertical than lower portions 18. They are substantially continuous in the circumferential sense, especially at the outer cell zones adjacent hinges 13, 15, being interrupted only at the crests 19 of the polygonal lower wall portions. Along the longitudinal center line of the carton the conical portions 20 define separator members 21 which are spaced longitudinally along the center line. Generally rectangular top surfaces 22 bridge surfaces 20 in a plane coinciding with the meeting plane of the carton sections.

The cell structure described above provides for the effective cushioning of the lower surface of the egg by the flat internal surfaces of lower cell wall portions 18, as illustrated in Fig. 3. These are inclined outwardly at

a sufficiently great angle to the vertical to receive the egg substantially downwardly in the cell. At the same time, the conical upper portions 20 confine the egg adequately at its zone of greater girth, yet do not occupy undue lateral space in doing this, due to their lesser inclination to the vertical than portions 18. In the modification shown in the drawings, the walls 18 incline outwardly at an angle of around 28° to the vertical and are positioned with respect to corresponding opposite walls so as to provide support high on the egg. At the same time, all but thin, narrow eggs are held above and out of contact with the bottoms 17. As the walls 18 are flexible, this provides a four-sided cushion protecting the bottoms of the eggs from vertical force and holds the egg in its upright position. If the cell walls were continued upwardly and outwardly at the same angle as the flat lower wall portions 18 thereof, the over-all size of the carton would substantially exceed that permitting its packing in a 30-dozen egg case, whereas, due to the lesser conical inclination, the filled carton is perfectly suited for such packing.

Referring particularly to Figs. 1 and 3, the space between successive cells 16 of the two rows and the cover hinge 13 and flange hinge 15, respectively, is occupied by outwardly and oppositely inclined abutment surfaces or ledges 23, 23' which merge inwardly from the hinges with the upper conical extremities of adjacent cells. Hinges 13 and 15 are double-creased to facilitate folding without unduly stressing the hinge, and to insure flush engagement of the cover section 12 across the bottom section 11 in the closed condition of the sections. The inclined abutments 23 are provided for special coaction with this special type hinge, as will appear.

The non-cellular cover section 12 is also shaped throughout its length along hinge 13, to provide a series of integrally connected abutment surfaces or ledges 25 which are laterally aligned with the respective inclined abutments 23 of the bottom section and are adapted to vertically engage the latter in the closed condition of the sections. It will be noted that the areas 23 and 25 are widest between adjacent cells and taper to their minimums at the center of the cells where there is virtually no ledge beyond the score lines. Without this scalloped effect on the cover, the line of bend between the cover and bottom tends to wander when the carton is closed. However, the abutment surfaces or platforms 23 and 25 form an adequate area for a substantial hinge and the restricted area at the center of the cells localizes the line of bend. To get this effect, the area 25 should extend at least the major part of the distance between the centers of adjacent egg cells.

Referring to Figs. 3 and 4, it is seen that the appreciable vertical height of the double-creased hinge 13 in the closed condition of the carton would normally result in a corresponding vertical spacing of the cover sections relative to one another, immediately adjacent the hinge, thus preventing their direct abutting engagement with one another along this line. Vertical load on the closed carton would then be sustained only by the hinge, with inevitable lateral shift of the sections relative to one another and vertical telescoping or collapse.

In order to offset or compensate for such unreliable support at the hinge, the ledges 23, 25 are mutually inclined from the upper and lower portions of hinge 13 in the direction inwardly of the hinge and toward one another, i. e., toward the meeting line of the carton sections 11, 12. They thus take positive abutting engagement with one another over substantial areas located inwardly of the hinge, in the closed condition of the sections illustrated in Figs. 3 and 4. This insures against vertical collapse of the cover section under load and resultant egg breakage, notwithstanding the vertical height of hinge 13.

Ledges 23' similar to ledges 23 are provided on the outer cover section front wall 24 for improved abutting engagement with certain portions of flaps 14, in a manner

to be described hereinafter. The wall 24 intermediate the space ledges 25' is outwardly convex at 26, in alignment with egg cells 16, and the opposite or rear wall 27 is provided with similar convexities 28 between ledges 25. These convex portions accommodate the upper, enlarged girth portion of the eggs in the respective cells.

The marginal portion of the cellular bottom section 11 adjoining the double creased flange hinge 15 is shaped to provide outwardly and downwardly inclined abutment ledges 23' identical to the ledges 23 on the opposite side of the section. The flange or flap 14 is similarly shaped to provide internal outwardly and upwardly inclined abutment ledges 29, as illustrated in Fig. 3. Thus the ledges 23' and 29 are mutually inclined from the upper and lower portions of hinge 15 in the direction inwardly of the hinge and toward one another, i. e., toward the meeting line of the carton sections 11, 12 and the ledges 25' are adapted to assume direct and positive engagement with the coacting inclined ledges 23' of the bottom section, in the same manner as the opposite set of abutment ledges 23, 25, when the flange 14 is swung from its original flat condition, shown in dotted lines in Fig. 2, to its operative upright position shown in solid line in that figure. Inward collapse of flange 14 is therefore insured against and it is held firmly in the upright condition in which it internally engages, and both internally and externally braces, the cover section 12. Flange 14 is coextensive in height with front cover wall 24, whereby its free edge 33 may engage the top panel 34 of the cover section in the closed condition of the sections. Flange-bottom section abutments 23', 29 thus compensate for the double height of flange hinge 15 and insure full engagement of the sections 11, 12 in closed condition. The abutments 29 of flange 14 are spaced by outwardly convex sections 30 corresponding in shape and function to the convexities 26, 28 of the cover section.

In use, eggs E are placed in the cells 16, smaller ends down, as illustrated in Fig. 2. The flap 14 is swung inwardly and upwardly for braced engagement of the ledges 29 thereof with the bottom section ledges 23', and cover section 12 is then swung downwardly over the flange 14 to the position illustrated in Figs. 3 and 4. In this position it frictionally engages the flange to resist inadvertent opening and its outwardly extending abutment ledges 25' vertically engage and are sustained by the outwardly and upwardly exposed abutment surfaces which are provided by the recessed ledges 29 of the flange 14.

The closed carton is triple braced at its forward wall, i. e., by the engagement of the flange and bottom section abutment ledges 29, 23', respectively, by the engagement of the free edge 33 of the flange with the top panel 34 of the cover section, and by the external engagement of the cover section abutments 25' with the upper external surface of abutment ledges 29. The opposite rear wall of the carton is also positively braced at coacting abutments 23, 25 and, furthermore, lateral shifting of the cover section tending to result in telescoping collapse is effectively prevented by the restraining action of hinge 13, 15 and the flange 14, the latter frictionally engaged by the forward cover wall. Staples may be applied through the triple thickness of material represented by the abutment portions 25', 29 and 23' between successive cells of the bottom section or adhesive may be employed between portions 29 and 25'.

The modification of the invention illustrated in Fig. 6 differs from that of Figs. 1 through 5 in that the upper surfaces 22 of the longitudinally spaced, medial divider or separator members 21 in the carbon bottom section, as shown in Fig. 1, are eliminated or cut away, leaving the scallop sided, generally rectangular apertures 36. These afford a desired circulation of air within the carton and a great flexibility of the walls of the cells to facilitate their cushioning effect, while at the same time preserving the function of subdividing its interior. While the openings 36 have been shown as extending about the

same area as the surfaces 22, they may also be of reduced area centrally positioned in the surfaces 22, and a smaller opening is contemplated within the scope of the invention.

Another slightly modified adaptation of the invention is illustrated in Figs. 7 and 8. This form of carton is, with certain exceptions, identical to that illustrated in Figs. 1 through 5, hence corresponding reference numerals have been employed to designate corresponding parts or features.

Experience has shown that when the straight line type, double-creased hinge 13 of the first embodiment is employed, there is some tendency of the same particularly when extra large size eggs are packaged, to bulge laterally outwardly in the space between successive cells, i. e., between the points at which its bending action is primarily localized. Such an outward bulge at the 180 degree bend may result in an undesirable increase in the over-all width of the closed carton; the invention contemplates compensation of the same by the special type of hinge creasing shown in Figs. 7 and 8. Referring to those figures, it is to be noted that the two creases of the cover-receptacle hinge, designated 37 and 38, are mildly shaped in an oppositely convex, scallop-like or undulatory outline in the zones corresponding to the respective abutment ledges 23, 25. This preserves all of the advantages of positive support and bend localization which are afforded by the location of the hinge creases immediately adjacent the cells and the mutually inwardly inclined abutment surfaces, yet when the carton is closed, as illustrated in Fig. 8, the tendency of the hinge to bulge outwardly intermediate the cells is offset. The portion of the crease construction between its convexities comes to an upright position and the outer surface of the carton extends as a straight line tangent to the outer surface of the cells of the receptacle section. A slight inwardly shaped contour of this line between the cells may even be developed by further exaggerating the curving of the creases 37, 38, which may be varied fairly widely. However, the invention merely contemplates sufficient shaping of one or both of the creases to eliminate outward convexities along the hinge when the sections of the carton are in closed relation.

The same outward bulging effect, if found to exist at the flange-receptacle hinge, may be corrected by a similar undulatory shaping of one or both of the creases which define this hinge, as indicated at 39.

As stated, the embodiment illustrated in Figs. 7 and 8 incorporates all the other features shown in Figs. 1 through 5. It is evident that it may also include ventilating and cushion-improving openings in the upstanding receptacle divider members 21, corresponding to the openings 36 found in the form of Fig. 6.

It may be noted that in all of the above described embodiments abutment of the cover section with the bottom section along the medial longitudinal zone of the separators 21 is rendered unnecessary by the special marginal bracing and abutting provisions described above. Therefore, the cover section is left in an open and tray-like or non-cellular character, permitting decoration or imprinting of the exposed upper surface of panel 34. Although the front wall 24 is shaped in conformity with the flap 14 to secure a frictional engagement with the latter over its entire area, it will be appreciated that the wall may be flat, if desired, for the purpose of affording an additional surface for printing or ornamentation.

I claim:

1. A molded pulp carton comprising a bottom section defined by an upwardly extending wall structure and provided with a plurality of contiguous article receiving cells successively arranged in row formation, said cells having lowermost egg supporting portions defined at least in part by relatively flat walls which flare outwardly and upwardly at a predetermined angle to the vertical and merge at their topmost limit into upper egg restraining portions disposed at a lesser angle to the vertical, successive cells

in a row being merged with one another substantially beneath the top of said wall structure and at the approximate elevation of the merger of said lower and upper cell portions.

2. A molded pulp carton comprising a bottom section defined by an upwardly extending wall structure and provided with a plurality of contiguous article receiving cells successively arranged in row formation, said cells having polygonal-walled lowermost egg supporting portions defined at least in part by relatively flat walls which diverge upwardly at a predetermined angle to the vertical and merge at their topmost limit into generally conical upper egg restraining portions disposed at a lesser angle to the vertical, successive cells in a row being merged with one another substantially beneath the top of said wall structure and at the approximate elevation of the merger of said lower and upper cell portions.

3. A molded pulp carton comprising a bottom section defined by an upwardly extending wall structure and provided with a plurality of contiguous article receiving cells successively arranged in row formation, said cells having lowermost egg supporting portions defined at least in part by relatively flat walls which flare outwardly and upwardly at a predetermined angle to the vertical and merge at their topmost limit into generally conical upper egg restraining portions disposed at a lesser angle to the vertical, successive cells in a row being merged with one another substantially beneath the top of said wall structure and at the approximate elevation of the merger of said lower and upper cell portions.

4. A molded pulp carton comprising coacting top and cellular bottom carton members integrally and bendably connected to one another by an undulatory hinge construction extending along corresponding margins of the members and closely adjacent cells of the bottom member, said hinge construction comprising alternate, differently configured crease sections which are respectively spread laterally and restricted laterally in a generally horizontal plane when the carton is fully open, said restricted and spread sections being in transverse alignment with said bottom member cells and with spaces between said cells, respectively, whereby when said carton is closed the hinge construction is of greater vertical height at the spread sections than at the restricted sections and is linear and undistorted along its length.

5. A molded pulp carton comprising coacting top and cellular bottom carton members integrally and bendably connected to one another by an undulatory hinge construction extending along corresponding margins of the members and closely adjacent cells of the bottom member, said hinge construction comprising alternate, differently configured crease sections which are respectively spread laterally and restricted laterally in a generally horizontal plane when the carton is fully open, said restricted and spread sections being in transverse alignment with said bottom member cells and with spaces between said cells, respectively, whereby when said carton is closed the hinge construction is of greater vertical height at the spread sections than at the restricted sections and is linear and undistorted along its length, said bottom member having inwardly extending, upwardly facing abutments immediately adjoining said spread section of said hinge construction, which abutments partially separate a pair of successive cells.

6. A molded pulp carton comprising coacting top and cellular bottom carton members integrally and bendably connected to one another by an undulatory hinge construction extending along corresponding margins of the members and closely adjacent cells of the bottom member, said hinge construction comprising alternate, differently configured crease sections which are respectively spread laterally and restricted laterally in a generally horizontal plane when the carton is fully open, said restricted and spread sections being in transverse alignment with said bottom member cells and with spaces between said

cells respectively, whereby when said carton is closed the hinge construction is of greater vertical height at the spread sections than at the restricted sections and is linear and undistorted along its length, said bottom member having inwardly extending, upwardly facing abutments immediately adjoining said spread sections of said hinge construction, which abutments partially separate a pair of successive cells, and said successive cells being further separated by tapered dividers merging upwardly into said abutments.

7. A molded pulp egg carton comprising a bottom forming section, a non-cellular cover forming section integrally hinged thereto along a margin thereof, and an internal bracing flap integrally connected to said bottom section by a hinge extending along the opposite margin and forming the top outer edge thereof, said bottom section having a row of cells located adjacent said last named hinge and abutment portions extending between pairs of said cells and projecting inwardly from the outer edge thereof which is formed by said hinge, said flap being shaped to provide an internally projecting abutment portion engaging a bottom section abutment portion in the closed condition of the carton and to provide an inwardly extending upwardly exposed, outer abutment surface above said internal abutment portion in said closed condition, said cover section including a wall externally telescoping said flap in vertically braced engagement therewith, said wall being coextensive in height with said flap and being shaped to provide at the bottom margin an inwardly extending external abutment element with a bottom surface for engaging said outer abutment surface of said flap when in said closed condition, the internally projecting abutment portions of said bottom section and said flap extending inwardly from the connecting hinge and being inclined inwardly therefrom toward the meeting line of said sections whereby inward movement of said flap is limited by the engagement of said abutment surfaces and said flap braces the wall of said cover section against lateral movement and vertical collapse.

8. A molded pulp egg carton comprising a cover section and a cellular bottom section integrally connected by a hinge along one margin thereof, said sections being provided with longitudinally spaced, laterally and vertically aligned abutment ledges adjacent and extending inwardly of said hinge, the ledges of at least one of said sections being inclined toward the meeting line of the sections, a shaped flap integrally connected to said bottom section by a hinge extending along the top margin of the wall thereof which is opposite said first named hinge and forming the top outer edge of said bottom section, said flap and bottom section being provided with longitudinally spaced, laterally aligned abutment portions adjacent and extending inwardly of said last named hinge between pairs of adjacent cells of said bottom section and adapted for abutting engagement with one another over substantial areas located inwardly of the hinge in the closed condition of said carton, certain of said last named abutment portions being inclined inwardly toward the meeting line of the carton cover and bottom sections, said cover section including a shaped wall telescoping said shaped flap in the closed condition of the sections and said wall being provided with external inwardly projecting marginal abutment portions located in lateral and vertical alignment with said flap abutment portions, which external portions vertically abut said flap abutment portions in said closed condition of the sections whereby inward movement of said flap is limited by the interengaging abutment portions and said flap braces and reinforces said cover section against lateral and vertical movement.

9. A molded pulp egg carton comprising a non-cellular cover section and a cellular bottom section integrally connected by a hinge along one margin thereof, said sections being provided with longitudinally spaced, laterally and vertically aligned abutment ledges adjacent and extending inwardly of said hinge, the ledges of at least

one of said sections being inclined toward the meeting line of the sections, a shaped flap integrally connected to said bottom section by a hinge extending along the top margin of the wall thereof which is opposite said first named hinge and forming the top outer edge of said bottom section, said flap and bottom section being provided with longitudinally spaced, laterally aligned abutment portions adjacent and extending inwardly of said last named hinge between pairs of adjacent cells of said bottom section and adapted for abutting engagement with one another over substantial areas located inwardly of the hinge in the closed condition of said carton, certain of said last named abutment portions being inclined inwardly toward the meeting line of the carton cover and bottom sections, said cover section including a shaped wall telescoping said shaped flap in the closed condition of the sections and said wall being provided with external inwardly projecting abutment portions located at the lower margin thereof and in lateral and vertical alignment with said flap abutment portions, which external abutment portions vertically abut said flap abutment portions in said closed condition of the sections, said telescoping wall having spaced frusto-conical sectional surfaces extending upwardly between said abutment portions and aligned laterally with the cells in said bottom section for accommodating the upper portions of the eggs in said cells and the inner face of said flap having corresponding spaced frusto-conical surfaces whereby inward movement of said flap is limited by the interengaging abutment portions and said wall and said flap are in snug engagement with said flap bracing and reinforcing said wall of said cover section against movement laterally and vertically.

10. A molded pulp egg carton according to claim 3 wherein said cells have a lowermost egg supporting portion comprising four relatively flat inclined walls which flare outwardly and upwardly from the four sides of a square horizontal bottom portion at an angle of approximately 28° to the vertical.

11. A molded pulp egg carton according to claim 3 wherein the line of merger between successive cells in a row is generally in the shape of an arc.

12. A molded pulp egg carton according to claim 3 wherein said cells are arranged in two rows of six cells each.

13. A molded pulp egg carton in accordance with claim 3 wherein said carton has a top cover portion integrally joined to said bottom section.

14. A molded pulp egg carton according to claim 11 wherein the line of merger between successive cells in a row is generally in the shape of an arc, and the lowermost curvature of the arc is at approximately the same elevation as the uppermost portion of said flat walls.

15. A molded pulp carton according to claim 4 wherein the crease line of said undulatory hinge construction is disposed along a substantially straight line which is essentially tangential to the outer circumferences of an aligned row of cells when said carton is in closing relationship.

16. A molded pulp carton according to claim 15 wherein the uppermost lateral extremities of a row of the cellular bottom members essentially defines a row of undulating circumferential arcs, the crease line of said undulatory hinge construction being disposed substantially tangentially to said aligned row of arcs when said carton is in closing relationship.

17. A molded pulp carton according to claim 4 wherein the top cover portion of the carton adjacent the crease line of said undulatory hinge construction is shaped so as to contain arcuate sections tangential to the hinge which will be substantially aligned with at least a substantial portion of the arcuate sections of the bottom member when the top and bottom are brought into closing relationship.

18. A molded pulp carton according to claim 4 having a bottom section as described in claim 1.

19. A molded pulp egg carton according to claim 7 wherein said hinges are substantially parallel to each other and each of said hinges is disposed along a line which is essentially tangential to opposing rows of arcs defined by the outer upper extremities of two rows of cells in the bottom section.

20. A molded pulp egg carton according to claim 7 having a bottom section as defined in claim 1.

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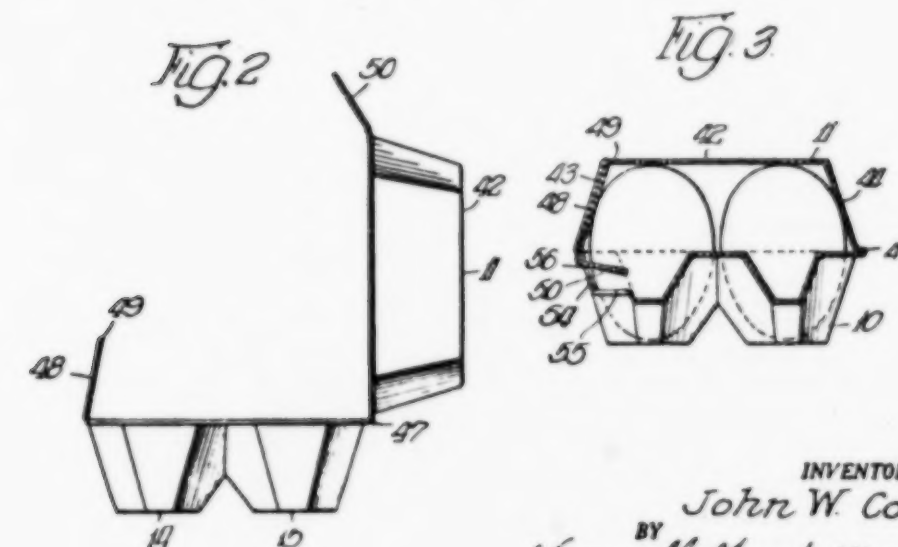
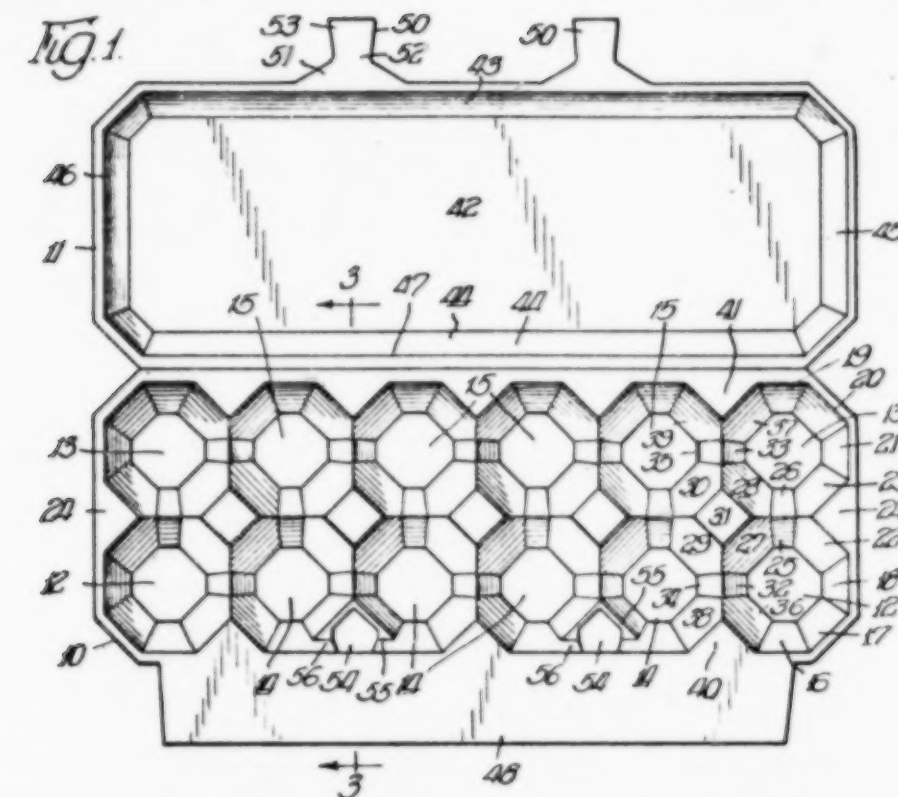
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CARTON

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2 Sheets-Sheet 1



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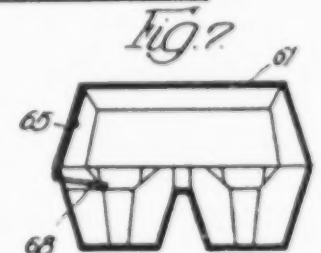
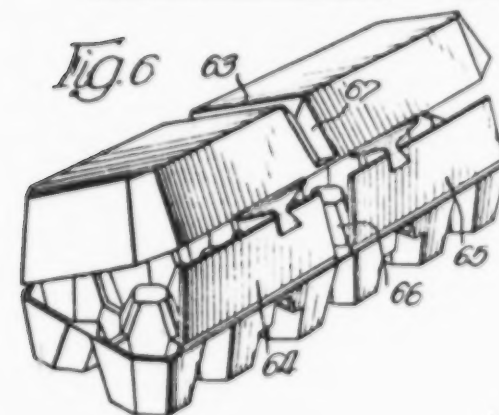
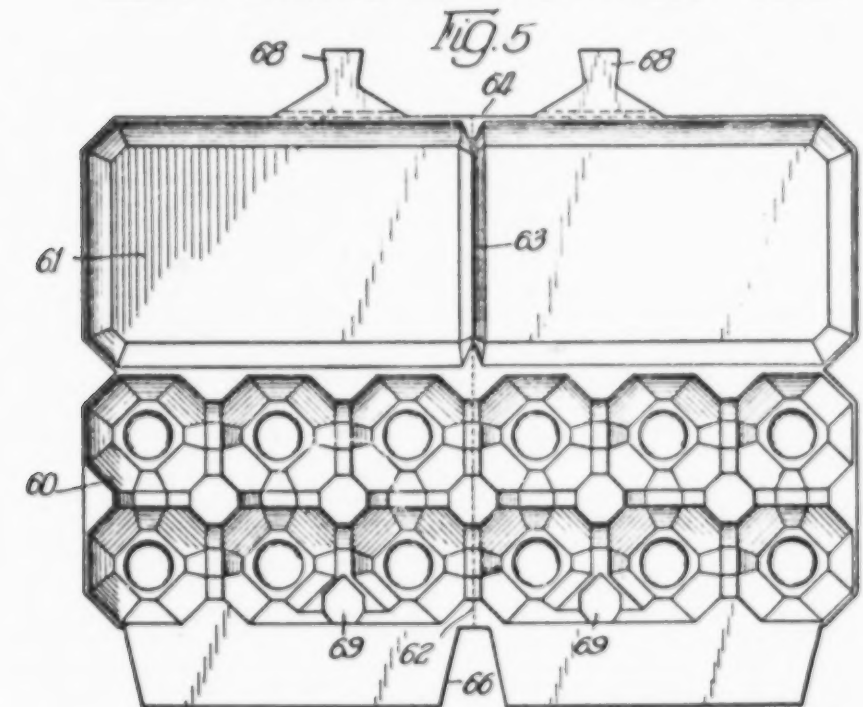
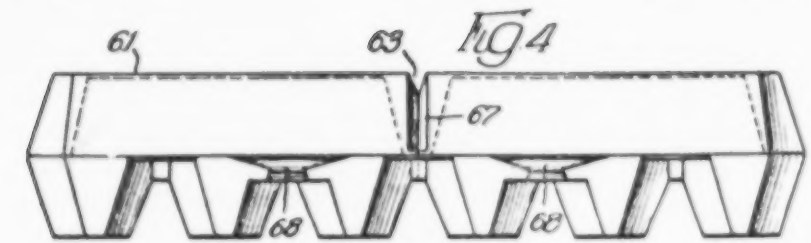
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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CARTON

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10 Claims. (Cl. 229—2.5)

1

This invention relates to improvements in molded pulp cartons, particularly cartons for use in packaging eggs.

In the packaging of eggs two types of cellular cartons have been in general commercial use. One type which provides three rows of four cells for receiving a dozen eggs has been successively molded from a watery slurry of paper pulp fibers. The other type which provides two rows of six cells for the eggs and which is more desirable because it may be conveniently packed, when filled, in the standard 30-dozen capacity egg case or crate, in which eggs are handled and shipped in bulk lots, has been manufactured heretofore from the more expensive paperboard materials which can be cut, creased and folded to provide the desired cellular structure. A commercially successful molded pulp carton of the 2 x 6 type has not heretofore been produced.

In order to be acceptable commercially the 2 x 6 carton must be made the proper size to fit in the standard egg case after removal of the fillers and flats from the case, without any reduction in the total number of eggs per case. In order to provide a molded carton adapted for this type of case packing which will have adequate cell capacity to receive a dozen eggs in properly spaced relation, the carton must be molded without any appreciable laterally extending marginal portions, such as the marginal flange at the meeting line of the cover and bottom sections which characterizes the conventional 3 x 4 molded pulp egg carton. Without having the marginal flange to rely upon to prevent telescoping of the top and bottom sections, 2 x 6 carton constructions which have heretofore been proposed have lacked sufficient strength and rigidity to withstand vertical stresses and prevent crushing of the eggs when the cartons are placed in superimposed tiers in a case and subjected to the usual handling encountered in shipment. Failure of the previously developed cartons has been due to the fact that relative movement between the top and bottom sections has not been prevented in such cartons and adequate bracing of the top cover section to prevent its collapse under vertical stresses has not been provided for.

It is a general object of the invention to provide a cellular molded pulp egg carton which overcomes the deficiencies inherent in the 2 x 6 molded pulp egg cartons previously developed, which meets all the requirements of a strong, compact rigid container of the proper size to fit in the standard case, which houses the eggs in such a manner that the percentage of egg break-

2

age in shipment is materially reduced and which may be more economically produced than the conventional paperboard egg carton.

It is a specific object of the invention to provide a cellular molded pulp egg carton of the proper size to fit within a standard egg case and having an adequate top bracing structure combined with a locking means which cooperates with the bracing structure to prevent any appreciable relative movement between the top and bottom sections of the carton.

It is a further object of the invention to provide a cellular molded pulp egg carton of the type described having a flap formed integral with the marginal edge of the bottom section which flap extends substantially the length of the top section when the carton is in closed condition and lies adjacent the inner front wall of the top section with its edge in substantially abutting relation with the top wall of the top section to reinforce and rigidify the carton and effectively prevent the failure of the carton when subjected to the vertical stresses encountered in the customary shipment and handling of a plurality of such cartons arranged in superimposed tiers in standard egg cases.

It is a still further object of the invention to provide a molded pulp egg carton of the type described wherein the bottom section of the carton is provided with an integrally molded panel along a marginal edge which is adapted to be inserted in the top or cover section in juxtaposed relation with a generally vertical wall of the section and with its edge in substantial abutting relation with the planar top wall of the cover section and wherein integral locking elements are provided on the marginal edge of a wall of the cover section which are adapted to interlockingly engage, from the outside of the carton, in apertures provided in the adjacent wall of the bottom section to rigidly brace and lock the cover section to the bottom section of the carton and prevent any appreciable relative movement between the sections.

It is another object of the invention to provide a molded pulp carton of the type described which embodies the improved cover bracing flap and cooperating locking means and which is also divisible transversely of the carton to provide cellular carton sections having less than a dozen eggs therein.

These and other objects of the invention will be apparent to those skilled in this art from a consideration of the preferred form of the in-

vention which is shown by way of illustration in the accompanying drawing, wherein:

Fig. 1 is a plan view of a 2 x 6 carton which embodies the principles of the invention;

Fig. 2 is an end elevation with the cover section hinged to an upright position and with the bracing panel bent to position for insertion in the cover section;

Fig. 3 is a transverse section taken on the line 3-3 of Fig. 1;

Fig. 4 is a front elevation of a divisible form of 2 x 6 carton having incorporated therein the bracing and locking features of the invention;

Fig. 5 is a plan view of the divisible carton shown in Fig. 4;

Fig. 6 is a perspective view of the divisible carton with the cover in partially closed condition; and

Fig. 7 is a transverse section taken on the line 7-7 of Fig. 5.

Referring to Figs. 1 to 3 of the drawings, there is illustrated a 2 x 6 carton which embodies the principles of the invention and which is capable of being readily molded from a watery slurry of paper pulp fibers.

The illustrated carton comprises a cellular bottom section 10 and a top or cover section 11. The carton bottom section 10 is formed to provide two longitudinal rows of six cells each for accommodating a dozen eggs therein. Each egg-receiving cell is generally octagonal in shape and is defined by a bottom and upwardly sloping integral wall forming panel members, with adjacent panel members merging or connected at their upper ends by web portions which define partitioning formations extending longitudinally and transversely between the cells, in the manner described hereinafter.

The cellular bottom section 10 comprises front and rear, end, or corner, cells 12 and 13 which are disposed in transverse alignment to form a pair of cells at each end of the section and intermediate, front and rear cells 14 and 15 which are also disposed in transverse alignment to form four intermediate pairs of cells between the end pairs. The carton is symmetrical about a transverse center line and the four rear intermediate cells 15 are identical while the four front intermediate cells 14 are also identical except for certain adjoining wall structure which will be described.

The structure of each of the end cells 12 and 13 is the same. These cells differ only in their position relative to the adjoining cells. Outer panels 16, 16 of the front end cell 12 and corresponding outer panels 19, 20, 21 of the rear end cell 13 extend upwardly to the substantially marginless upper edge of the bottom section 10 and define front and rear corner and end side wall forming portions for the section 10. Panels 22 and 23 which adjoin panels 16 and 21, respectively, extend upwardly and are integrally joined at their upper edges with a triangular web section 24 which extends inwardly from the top of the end edge of the section 10 to define the end portion of the longitudinal partition formation. Panels 25 and 26 of cells 12 and 13 extend upwardly and merge below the plane of the top edge of the section 10 to define an upstanding ridge-like portion of the longitudinal partition formation which adjoins the end portion thereof. A like partition formation is provided by the corresponding upwardly merging wall panels of each pair of transversely aligned cells. Panels 27 and 28 of cells 12 and 13 and the ad-

jacent panels 29 and 30 of the adjoining intermediate cells 14 and 15, respectively, extend upwardly and are integrally joined at their upper edges by a rectangular horizontal web portion 31 to define a truncated intermediate partition formation. A like partition formation is defined by the corresponding adjacent wall panels of each set of four adjoining cells. These truncated formations combined with the triangle end partition formations and the intermediate ridge-like partition formations provide the longitudinal or medial partition which divides the cells into two longitudinal rows.

The wall forming panels 32 and 33 of the cells 12 and 13 extend upwardly and merge with the adjacent wall forming panels 34 and 35 of the adjoining intermediate cells 14 and 15 to form ridge-like partition portions extending transversely between the end pair of cells 12 and 13 and the adjacent intermediate pair of cells 14 and 15. The wall forming panels 36 and 37 of the cells 12 and 13 extend upwardly in merging relation with the adjacent wall forming panels 38 and 39 of the adjoining intermediate cells 14 and 15 and are integrally joined with triangular webs 40 and 41, respectively, which extend inwardly from the front and rear top edges of section 10, to form triangular transverse end partition formations. These formations combined with the central truncated partition formation and the connecting transverse ridge-like partition formations define the transverse partition between the pairs of cells. Each pair of cells is separated from the adjoining pair of cells by a like transverse partition. All the cells are provided with bottom members which integrally join the bottom edges of the wall forming panels and which constitute the bottom or supporting face of the carton.

The end wall forming panels 16 and 21 of the end cells 12 and 13 constitute the upwardly and outwardly sloping outer end wall faces or surfaces of the section 10 while the front and rear wall forming panels 19 and 20 thereof combined with the corresponding wall forming panels of the intermediate cells 14 and 15 constitute the outer side wall faces or surfaces of the section 10.

The carton cover section 11 is formed by integrally connected planar top wall 42, front and back side walls 43, 44 and end walls 45, 46. The front, side and end walls 43, 45 and 46 extend outwardly in angular relation to the top wall 42 and terminate in a substantially flangeless lower edge while the rear wall 44 extends in the same angular relation and is integrally connected by a hinge joint 47 with the upper edge of the rear wall formation of the bottom section 10. The end corners are formed to correspond with the end corners of the bottom section 10.

A cover bracing and reinforcing panel or flap member 48 is provided along the top edge of the front wall of the carton section 11. The panel 48 which is preferably molded substantially in the plane of the top edge of the section extends substantially the full length of the carton front wall and is adapted to be hinged to an upwardly extending position (Fig. 2) for insertion in the carton cover section 11 where it is received in juxtaposed relation to the front wall 43 of the latter with its free edge 49 in substantially abutting relation with the inner surface of the top wall 42 of the cover section when the cover section is in fully closed position.

The front wall 43 of the cover section 11 is

provided with a pair of longitudinally spaced integrally molded locking tabs or tongue formations 50 each comprising a body portion 51, a reduced neck portion 52 and a wedge shaped head 53 which are molded in outstanding relation but which are adapted to be folded downwardly about the meeting edges of the bottom and cover sections of the carton when the cover section is in closed position.

The front wall of the bottom section 10 is provided with a pair of locking apertures 54 for cooperation with the locking tabs 50. The apertures 54 are located in triangular partition formations between adjacent intermediate front cells 14. A generally horizontal ledge 55 is formed intermediate the bottom of the section 10 and the top edge thereof which extends inwardly from a generally vertical wall section 56. The wall section 56 extends downwardly between the upper portions of the outer wall forming panels of the adjacent cells 14 and substantially in the same plane as the panels. The bottom portion of the aperture 54, which is in the horizontal ledge 55, is triangular while the upper portion of the aperture 54, which is in the wall section 56, is generally rectangular and somewhat narrower at the upper end thereof.

When the cover section 11 is hinged to the closed position with the bracing flap 48 in proper position within the cover section, the locking tabs 50 are bent downwardly around or over the meeting edge of the front wall portions of the bottom and cover sections and the heads 53 thereof are inserted in the apertures 54 in interlocking relation therewith. The bracing flap 48 is positioned between the top portions of the eggs positioned in the front cells 12, 14 and the cover front wall 43 and is retained in bracing relation with the cover section by the eggs. The bottom edges of the cover end walls 45 and 46 are supported on the inwardly extending abutment forming webs 24. The carton sections are held in closed relation by means of the locking tabs 50 which are securely fastened with their heads 53 in interlocking engagement in the apertures 54. The locking tab heads 53 are engaged in the apertures 54 by a downward and inward movement which positions the heads 53 in the space between adjacent eggs in the carton without danger of breaking the eggs. The arrangement provides a strong, rigid carton which can be successfully molded, which can be packed in the standard egg case as desired and which resists collapse and telescoping of the carton sections in a highly satisfactory manner.

The carton which is shown in Figs. 4 to 6 illustrates the invention embodied in a divisible carton. It comprises a cellular bottom section 60 and a cover section 61 which is hingedly connected thereto along the top edge of the rear wall thereof.

The bottom section 60 is molded to provide two longitudinal parallel rows of egg receiving cells 62 which are transversely aligned in pairs and separated by partition formations defined by merging wall forming panels, in the same manner as in the carton structure shown in Figs. 1 to 3, except for the ridge-like portions of the partition formations between the respective cells, which are flattened along the top edges of the merging wall forming panels constituting the same. The central transverse partition formation is provided with a perforated or weakened line 63 to facilitate separation of the carton into two portions of six cells each.

The carton cover section 61 is the same as in the non-divisible carton of Figs. 1 to 3 except for an inwardly extending dividing groove or valley 64 which extends transversely of the top and side walls thereof on the transverse center line and is provided with a perforated or weakened line 65 to facilitate separation of the carton into the two portions.

The carton bottom section 60 is provided along the upper edge of the front wall thereof with bracing panel members 66, 65 which correspond to the bracing panel member 47 of the non-divisible carton being separated adjacent the transverse center line by a space 66 sufficient to accommodate the front end 67 of the cover separating groove 63.

The cover section 61 is provided with locking tabs 68 which are identical in form with the corresponding tabs 50 in the non-divisible carton. The bottom section 60 is provided with cooperating apertures 69, which are identical with the apertures 54 for receiving in interlocking relation the heads of the locking tabs 68. The apertures 69 are located between the front cells which are immediately adjacent the transverse dividing line 62 of the carton so that when the tabs 68 are engaged therein the lock is closely adjacent the inner ends of the separated portions of the carton after it is divided. This construction insures greater rigidity in the separated portions.

The divisible carton is illustrated as separable along a transverse center line but the division may be along any other line or lines to divide the carton into portions of any desired size, the cover bracing flaps and the latching tabs being arranged as required by the location of the dividing line or lines to best serve the bracing and locking functions.

While specific details of construction and materials have been referred to in describing the illustrated forms of the invention, it will be understood that other details of construction and other materials may be resorted to within the spirit of the invention.

I claim:

1. A molded pulp carton, comprising a cellular bottom section having a cover-locking detent between adjacent cells, a non-cellular, tray-like cover section having top, front, rear and end walls, said cover being hinged to said bottom section along said rear wall, a cover bracing flap hinged to said bottom section and extending upwardly along the inside of the front wall of said cover section into generally upright bracing position with respect thereto when the sections are in closed relation, and a cover locking tab integral with the front wall of said cover, said tab being positioned in interlocking engagement with the detent in said bottom section from the outside of said carton.

2. A molded pulp carton, comprising a cellular bottom section, a non-cellular, tray-like cover section having a planar top and outwardly and downwardly extending planar front, rear and end walls, said cover section being hinged to said bottom section along said rear wall, a cover bracing flap hinged to the front wall of said bottom section and extending upwardly and inwardly along the inside of the front wall of said cover section to a position abutting the under side of said planar top when said sections are in closed relation, and a cover-locking tab integrally hinged to the front wall of said cover section to position the same between adjacent cells in said bottom section, said bottom section having a detent for

7

interlocking engagement with said tab, and said tab being engaged with said detent from the outside of said carton.

3. A molded pulp carton, comprising a bottom section having a row of downwardly extending cells spaced apart at their lower portion, said bottom section having a tab-receiving opening between adjacent cells, a non-cellular, tray-like cover section having top, front, rear and end walls, said cover section being hinged to said bottom section along said rear wall, an integrally formed extension on said bottom section forming a cover bracing panel adjacent the front wall of said cover, said panel being upwardly folded along the inside of said front wall into upright bracing position with respect to said cover when said sections are in closed relation, and an integral extension of said front wall forming a locking tab, said tab being interlocked with the opening in said bottom section from the outside of said carton.

4. A molded pulp carton, comprising a bottom section divided into cells, a non-cellular, tray-like cover section having a top and outwardly and downwardly extending front, rear and end walls, an internal cover bracing flange on one side of said bottom section and of substantially the same height as the height of the front wall of said cover section, said flange extending upwardly along the inside of said front wall into bracing relation with respect to said cover section, and means exteriorly movable when the carton sections are in closed relation for securing said bottom and cover sections in closed position.

5. A divisible molded pulp carton, comprising a bottom section having two rows of separated cells, two cover bracing flange sections integrally hinged along the front side of said bottom section, a non-cellular, tray-like cover section having a top and downwardly extending front, rear and end walls and having a transverse depression between the ends thereof, said flange sections having a space therebetween in alignment with the transverse depression in the cover section when the carton sections are in closed relation, said flange sections extending upwardly on the inside of the front wall of said cover section into bracing relation therewith, and means integral with said cover section and exteriorly movable into locking relation to said bottom section when the carton sections are in closed relation for securing said cover and bottom sections in closed relation, said securing means being arranged on opposite sides of the space between said flange sections whereby upon division of the carton the bottom and cover sections of the separated portions will be maintained in closed relation.

6. A molded pulp carton, comprising a bottom section having parallel rows of downwardly extending cells, adjacent cells in each row merging at their upper portions and being separated at their lower portions, horizontal cover bracing flange means integrally connected to the front side of said bottom section and composed of adjacent parts extending outwardly from a central portion of the carton between adjacent cells, said bottom section having hook-receiving openings between the cells next adjacent the inner portion of each of said parts, a non-cellular, tray-like cover section hinged to the rear side of said bottom and having a transverse depression adjacent the inner portions of said flange parts between said openings, and integral hooks on said cover for engagement with the openings in said bottom

8

section from the outside thereof, said flange parts extending upwardly along the inner side of said cover into bracing relation with the upper portion thereof.

7. A molded pulp carton comprising a bottom section having side and end walls and means subdividing the space within said walls into cells, said means including transverse partition elements extending between and connected to said side walls, said bottom section being provided with a locking aperture in one of the side walls thereof between adjacent cells, a bracing flange hinged to said one wall above said aperture, a non-cellular, tray-like cover section having a top and side and end walls, one of said cover walls being hinged to the bottom section, said cover section being positionable with another wall thereof encompassing said flange in side-by-side relation in the closed position of said sections, said flange being of sufficient height to marginally engage and brace said cover section top in said closed position, and a locking element integrally projecting from said cover as a marginal extension thereof in alignment with said aperture and engaging the same to secure said cover and bottom sections in said closed position.

8. A molded pulp carton comprising a bottom section having side and end walls and means subdividing the space within said walls into cells, said means including transverse partition elements extending between and connected to said side walls, said bottom section being provided with a locking formation in one of the side walls thereof between adjacent cells, a bracing flange hinged to said one wall above said formation, a non-cellular, tray-like cover section having a top and side and end walls, one of said cover section walls being hinged to the bottom section, said cover section being positionable with another wall thereof encompassing said flange in side-by-side relation in the closed position of said sections, said flange being disposed at an angle to its associated wall in said closed position and being of sufficient height to marginally engage and brace said cover section top in said closed position, and a locking element projecting from said cover as a marginal extension thereof in alignment with said formation and engaging the same to secure said cover and bottom sections in said closed position.

9. A molded pulp carton comprising a cellular bottom section, a non-cellular, tray-like cover section provided with a planar top, said sections each being provided with integrally connected front, rear and end walls, the rear wall of said cover section being integrally hinged to the rear wall of said bottom section, a cover bracing flange integrally hinged along the front wall of said bottom section, and positionable within the front wall of said cover section and in side-by-side contact therewith throughout the entire inside height of said cover section front wall, said flange being of sufficient height to engage and brace the top of said cover section when said sections are in closed locked relation, and means to lock said sections in said relation.

10. A molded pulp carton comprising a cellular bottom section, a non-cellular tray-like cover section, said sections each including integrally connected front, rear and end walls and the cover section having a top panel extending between and integral with the walls thereof, the rear wall of said cover section being hinged to the rear wall of said bottom section, and a cover bracing flange integrally hinged along the front wall of said

9

cellular bottom section, said flange being positionable within the front wall of said non-cellular cover section in side-by-side contact with said front wall in the closed relation of the sections and being of sufficient height to engage and brace the top panel of said tray-like cover section in said closed relation.

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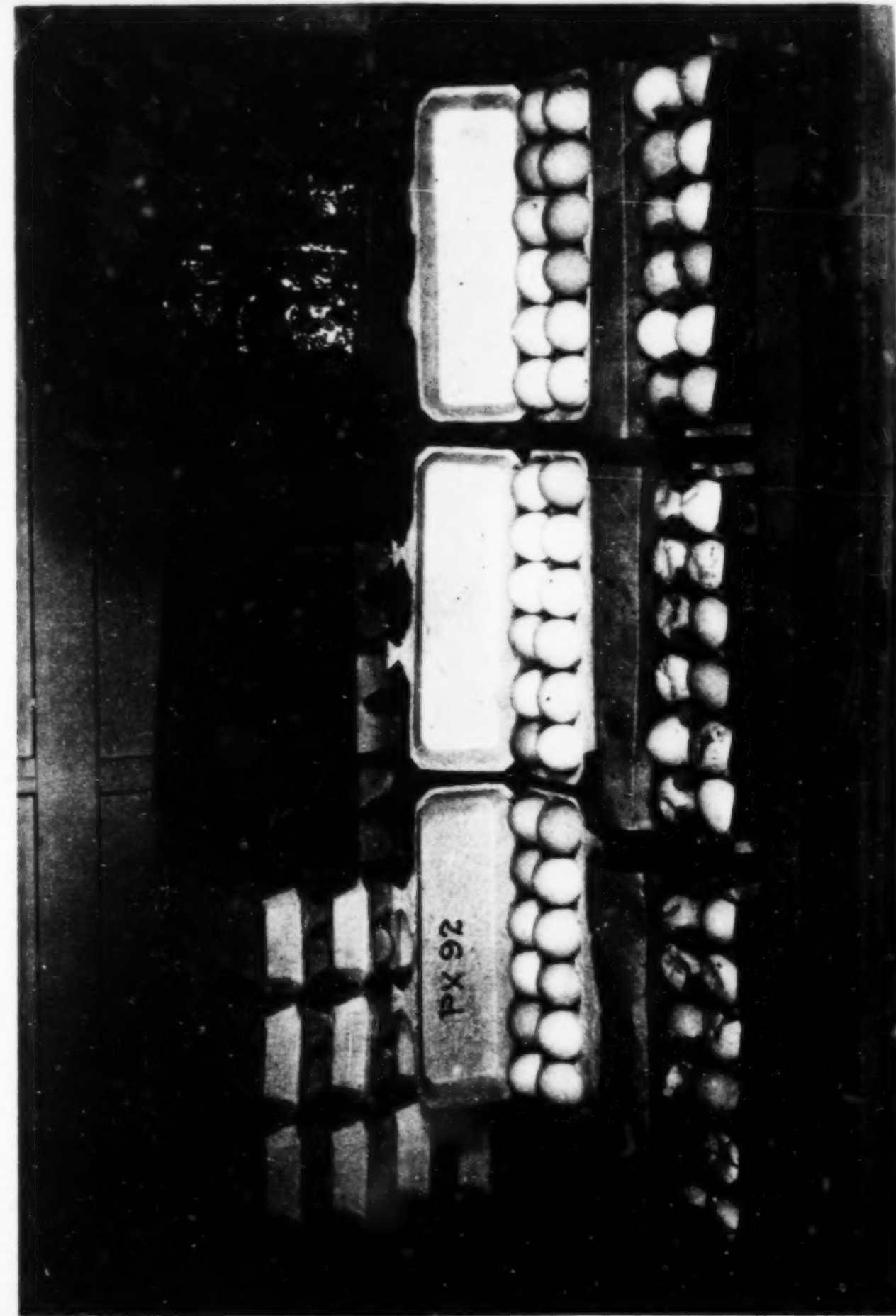
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Sept. 14, 1937.

M. KOPPELMAN

2,093,280

SELF LOCKING CARTON AND PACKING

Filed Dec. 6, 1934

2 Sheets-Sheet 1

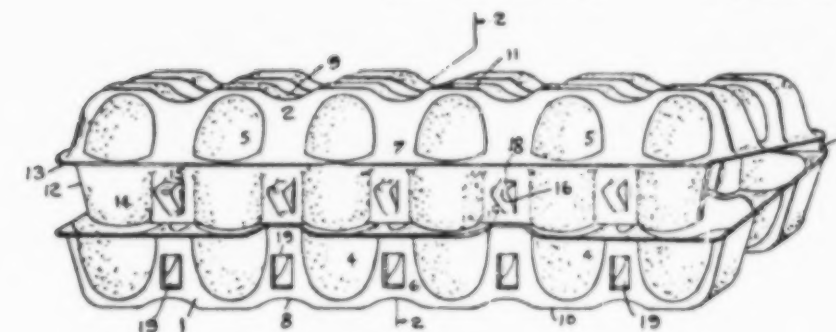


Fig. 1

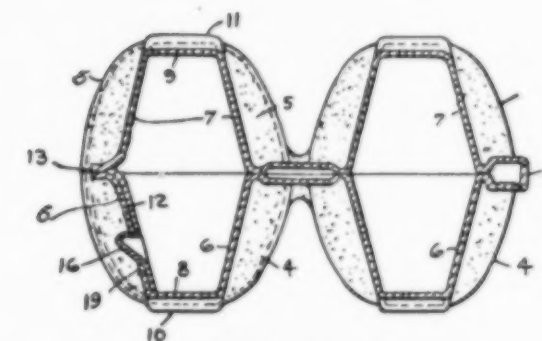


Fig. 2

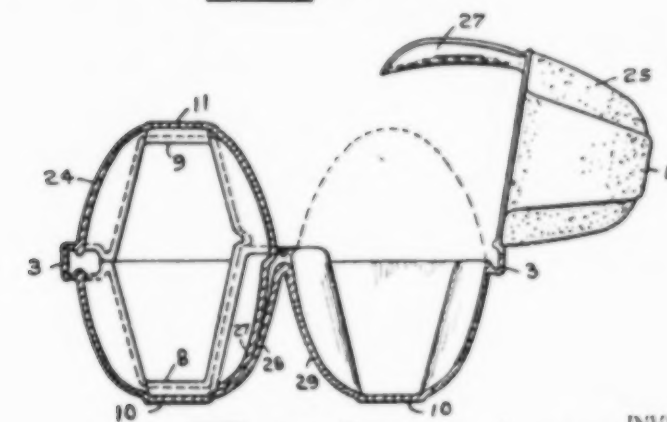


Fig. 3

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2 Sheets-Sheet 2

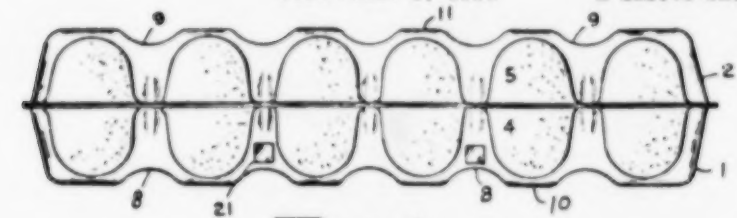


Fig. 4

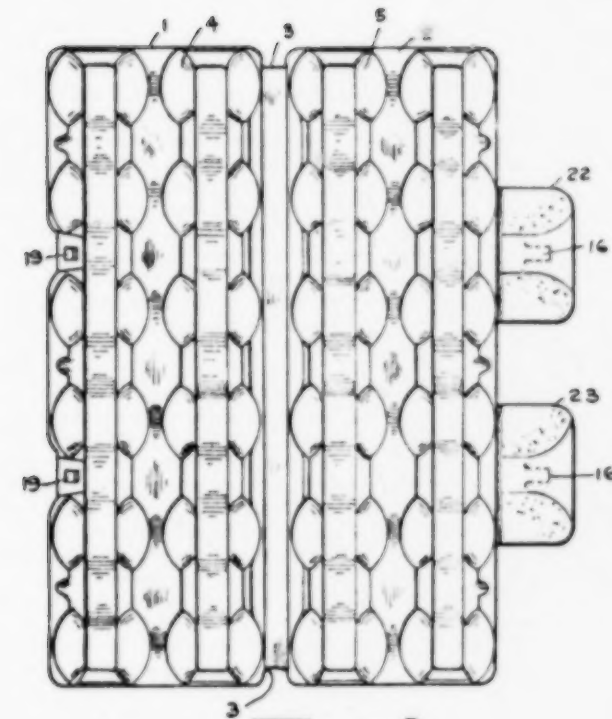


Fig. 5

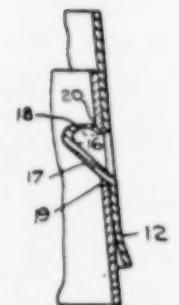


Fig. 6

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2,093,280

SELF-LOCKING CARTON AND PACKING

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Application December 6, 1934, Serial No. 756,227

5 Claims. (Cl. 229-29)

The improvements relate to cartons or carriers for eggs or other articles which require separation from one another and protection from injury through contact with one another or with other objects or by shocks or jars encountered in transportation and handling.

The primary object of the improvements is to provide a carrier of the kind indicated which will serve both as a packing for the articles and as a delivery carton and will be self locking, thus doing away with the necessity for an outer carton or wrapping and also all tying or fastening means, such as cord, hooks or clasps, and saving the time and expense involved in the use of these.

Heretofore it has been the practice to pack eggs and other fragile articles in boxes or cartons having "fillers" inside to receive, separate and protect the said articles, and to close such cartons by means of hooks, latches or the like either formed of the material of which the carton is made or of metal, or by wrapping the carton in strong paper or a paper bag and/or tie it with a cord. But even when the carton is made of stiff paper board the closures formed of the carton material are insecure and likely to yield or break and permit the carton to open and spill its contents, and where an outer wrapping or metallic fasteners or a cord are used the expense to the vendor of the articles in materials or time or both is considerable and substantially increases the cost to the consumer or reduces the vendor's profit.

When the cartons or carriers are made by the pulp sucking process and have article holding and protecting means integral therewith, the sheet material of which they are thus formed is too pliant and too easily fractured to permit of the formation of dependable fastening means integral therewith and of any known form. Many attempts have been made to provide such a fastening, but so far as can be ascertained they have all been unsuccessful, and no form of fastening has heretofore been devised which can be made integral with the carrier in the pulp sucking process and will provide a secure closure.

It will be understood that cartons or carriers can be made by the pulp sucking process in one molding operation thereby saving the labor and other cost involved in the fabrication of such an article from sheet material and at the same time provide a very efficient protective carton or carrier which has many advantages over those so fabricated. Examples of cartons or carriers of this type are shown in Patents No. 1,780,264 of November 4, 1930, and No. 1,846,561 of February

23, 1932, granted to me. The present improvements relate primarily to cartons of this character and of similar character made by the pulp sucking or molding process.

It is customary to make such cartons of a size to hold one dozen eggs, with the egg pockets or cells arranged in two rows of six each. Such a carton has been chosen for the illustrative embodiment of the invention shown in the accompanying drawings and referred to herein.

In the said drawings, Figure 1 is a perspective view of an egg carton embodying the improvements;

Fig. 2 is an enlarged vertical cross section of the carton shown in Fig. 1 closed, substantially on the line 2-2 in that figure;

Fig. 3 is a view similar to Fig. 2 showing a modification;

Fig. 4 is a front view of the embodiment of Fig. 1 slightly modified and on the same scale as Fig. 1, showing the carton in closed position, whereas in Fig. 1 it is shown partly open;

Fig. 5 is a plan of the embodiment of Fig. 4 showing the carton in open position, as it appears when it comes from the mold;

Fig. 6 is an enlarged vertical section of the locking members and adjacent parts.

The weight of eggs is relatively great, and as cartons and other devices in which they are sold to the consumer and carried must be of relatively light material, due to the cost of manufacture and raw materials and transportation costs, the problem of providing a marketable container in which these heavy fragile articles can be safely carried and handled is a difficult one. The problem of securing the carrier against accidental opening, without using wrapping paper, twine or metal fastenings or an extra outer carton is also serious, and in carriers made of molded pulp has heretofore so far as can be ascertained remained unsolved. By the present improvements a locking device which not only takes advantage of the weight of the eggs and their pressure against the walls of the carton is provided but one which may be easily secured and opened by a simple manipulation. At the same time the closure is such that it will secure the carton in closed position and maintain it in such position against all ordinary shocks and strains due to carrying and handling. It is also of such a character that it can be made complete in the single operation of molding the carton, and without any additional cutting, pressing or other operation.

In the said drawings, 1 represents the bottom and 2 the top section of an egg carton, these two

sections being joined along one edge by a hinge 3 on which they are folded. 4 represents the lower and 5 the upper cups of the carton, which when the carton is folded over and closed constitute egg holding cells. Between these cups are connecting and spacing portions 6 and 7 respectively, and these portions are indented at their outer extremities as shown at 8 and 9, while the extremities opposite the cups are flat, as shown at 10 and 11. These flat portions 10 and 11 provide a secure base upon which the carton may rest and also afford a surface which may be used for printing names, dates, or other matter, if desired. The portions 8 and 9, being arched, tend to strengthen the top and bottom of the carton and also afford a grip for the fingers, when the carton is handled.

In the form of Figs. 1 and 2, a continuous flap 12 runs along the outer longitudinal edge of the upper section 2 and is connected therewith by a hinge 13 formed of a narrow strip of material running between the said section and the flap with a weak line along its center. The flap is molded in open position and extending from the body of the carton in a substantially horizontal plane, as are also the short, separate flaps of the modified form shown in Figs. 4 and 5, so that the first user can on closing the carton on the hinge member 3 turn the flap in to a position substantially at right angles to its original position and slip it inside the outer forward wall of the bottom section 1. This flap is not flat, but is provided with alternate curved portions 14 and relatively flat portions 15 throughout its length, approximating the alternated cups and connecting portions 4 and 6 in contour, but approaching the planiform slightly, so that when forced in between the eggs and their cups and inside the connecting portions 6 it will be placed under tension and distorted slightly, causing substantial frictional coaction tending to hold it in this position. This frictional coaction is also increased by the tendency of the flap to return to its original position which causes it to press outwardly against the inner wall of the lower carton section and causing its button members to be constantly pressed through the apertures in said section.

The flap 12 is provided with a series of button members 16 projecting therefrom, and formed therein in the molding operation. Each of these button members has an inclined face 17 and an abrupt face 18, and the abrupt face is preferably made thinner than the inclined face, so that the edges 20 of the aperture 19 will tend to bite into it and prevent the button member from slipping out easily (see Fig. 6). These button members may have any serviceable form, but the form shown has been found effective and satisfactory, since it facilitates the insertion of the flap inside the wall of the bottom section, by reason of its beveled lower portion, snaps into the apertures 19, and holds the flap against withdrawal, by reason of the abrupt face 18. The apertures 19 are also formed in the operation of molding the carton, and may have any satisfactory form. In the embodiment shown they are substantially oblong rectangles, corresponding in size and shape to the base of the button members 16, and just large enough to receive the said members and permit them to project therethrough and beyond the wall of the carton section, in which position they are held by the outward pressure of the flap and the pressure of the eggs in the adjacent cells against it. It will be seen that as the flap 12 is forced in between the eggs and the

walls of the lower cups and below the greatest horizontal diameter of both, there will be a substantial gripping of the flap which will prevent it from being easily withdrawn and assist the buttons and apertures in holding it and the sections of the carton securely closed.

The apertures 19 are preferably holes extending through the front wall of the lower carton section, but may be relatively deep recesses or indentations. Such a recess is shown at 21 in Fig. 4. The form shown in Fig. 1, however, has been found desirable not only because it provides relatively sharp edges to engage the button members but because it can be produced in the molding operation by inserting an imperforate piece of sheet metal in the wire mesh of which the molding form is usually made, so that no pulp adheres to the form at that point and an opening is left. The weak portion of the abrupt face 18 of the button may be produced by having the mesh of the screen molding form closer at that point than elsewhere, and thus causing the deposit of a thinner layer of pulp fibres thereon.

In the modified form of Figs. 4 and 5, instead of having a continuous flap along the outer edge of the upper carton section two separate flaps 22 and 23 are employed, each with a button member 16 thereon, and two apertures 19 in line therewith are provided in the forward outer wall of the lower section; otherwise the construction is the same. It will be understood that more than two of these flaps may be employed, and that the apertures may be in the flaps and the button members in the wall, if such an arrangement can be manufactured to advantage.

In the modification of Fig. 3, the upper carton section is made in two parts 24 and 25, each hinged to an outer longitudinal edge of the lower section. In this case each upper part is provided at its outer edge with a flap 27 similar to 22 and 23 or 12, and having substantially the same contour. In this case an effective closure is provided without the employment of the button and socket devices 16, 19, as the flaps are forced in between the inner walls 28 and 29 of the bottom section and the eggs in its pockets. The button and socket or aperture arrangement may, however, be employed in this modification, and for some purposes the said arrangement may be omitted in the form shown in Fig. 1, and the frictional coaction between the flap and the wall and pocketed articles depended on to hold the flap and maintain the closure.

In the use of the device, the eggs or other articles are first placed in the pockets of the lower section and the upper section folded thereover, or otherwise placed thereon, so that its pockets register with the pockets of the lower section and form cells for the said articles. When the flap or flaps of the upper section have their outer edges at the upper edges of the lower section they are pressed inwardly so that their said outer edges enter inside the said upper edge. The top or cover section is then pressed home, forcing the flap or flaps down and between the eggs and the lower walls of their cells and causing the button members to snap into the apertures—where said button members and apertures are employed. To open the carton it is only necessary to press with one finger against the top of the wall which is engaged by the flap, push it outward slightly and pull quickly on the upper section adjacent the flap.

Various modifications in the construction and arrangement shown and described may be made

without departing from the scope of the present invention, two of the most important features of which reside in the construction and arrangement whereby the weight and pressure of the articles in the carton are employed in part to hold the closure and whereby the entire carton and its locking means may be made in a single molding operation.

The molding operation employed is the usual pulp sucking method of molding in which the foraminous forms are passed through a bath of pulp fibres, with their outer surfaces exposed to said bath, while suction is maintained on the opposite side of said forms to draw the fibres against the forms and cause them to form a film or sheet thereon. The forms are then removed from the bath, with these molded sheets thereon, and the sheets then removed and dried. The cartons or carriers embodying the present improvements may however be made by other methods, such as certain paper making methods in which the pulp is sprayed or flowed on to the plates, and in which suction may or may not be employed. But the method or process referred to herein is the most efficient and satisfactory method heretofore practiced for the manufacture of non-planiform sheets of fibres, and the construction and arrangement embodying the improvements has peculiar advantages in connection with the practice of the same, while the said method or process has a peculiar relation to the cartons or carriers embodying such improvements.

Instead of providing the abrupt face of the button member with a weak, yielding portion it may have an aperture therein, formed in manner similar to the aperture 19, and this aperture—or the weak portion—may extend slightly into the adjacent sides thereof, as indicated by dotted lines at 18' in Fig. 6, and instead of inserting an imperforate piece of metal in the foraminous mold or form the small interstices of the form may be filled or closed up by solder or brazing or in other manner where the apertures are to be formed. Various other modifications in or equivalents for the parts described and the method of producing the same may be employed without departing from the scope of the invention.

What I claim is:

1. In a device of the character indicated, a non-planiform, fibrous sheet comprising a plurality of sections having article-receiving recesses therein, one of said sections adapted to be placed upon the other to form a hollow container, a curved extension on one edge of one of said sections normally projecting beyond the other section when said first section is superposed and below the upper portion thereof, said extension being adapted to be passed into the other section between the wall of an article-receiving and article contacting recess of said other section and an article in said recess and partly beneath said article, whereby said two sections are secured together in closed article-containing position.

2. In a device of the character indicated, a non-planiform, fibrous sheet comprising a plurality of sections having article-receiving recesses therein, one of said sections adapted to be placed upon the other to form a hollow container, an extension on one edge of one of said sections nor-

mally projecting beyond the other section when said first section is superposed, said extension being adapted to be passed into the other section between the wall of an article-receiving and article contacting recess of said other section and an article in said recess, whereby said two sections are secured together in closed article-containing position, said extension and wall having one of them an aperture for receiving a button member on the other, and a button member projecting from the other and integral therewith, and constructed and arranged to engage said aperture at a point in the plane of a portion of said article.

3. In a device of the character indicated, a non-planiform, fibrous sheet comprising a plurality of sections having article-receiving recesses therein, one of said sections adapted to be placed upon the other to form a hollow container, an extension on one edge of one of said sections normally projecting beyond the other section when said first section is superposed, said extension being adapted to be passed into the other section between the wall of an article-receiving and article contacting recess of said other section and an article in said recess, whereby said two sections are secured together in closed article-containing position, said extension and wall having one of them an aperture for receiving a button member on the other, and a button member projecting from the other and integral therewith, and constructed and arranged to engage said aperture at a point in the plane of a portion of said article, and said button member having an inclined face toward the outer edge of the extension.

4. In a packing device for fragile articles comprising a fibrous sheet having article-engaging formations therein and adapted to receive and hold such articles, there being an aperture in one side of the sheet, a projection in the other side of the sheet adapted to engage in said aperture to secure the sides of the sheet together, said projection having a face adapted to engage an edge of said aperture and a non-resisting portion at said face adapted when the sides of the sheet are subjected to separating strain to permit said edge to enter beneath the top of said projection and hold said portions of the sheet against relative lateral movement.

5. In a device of the character indicated, a non-planiform fibrous sheet having article-receiving compartments therein, a second sheet adapted to be placed upon the first sheet to close the same and form a hollow container, a curved extension on the second sheet normally projecting beyond and overlapping a portion of the first sheet and extending into at least one article-receiving compartment thereof when the sheets are in superposed relation and below the upper portion thereof, said extension being adapted to pass between a wall of an article-receiving compartment and an article therein and partly beneath said article, whereby said two sheets may be secured together to form a closed container with articles therein, the said extension and compartment wall being constructed to engage each other and the extension to exert pressure between said wall and the article, whereby the container is secured in closed condition by frictional coaction between the parts.

MORRIS KOPPELMAN.

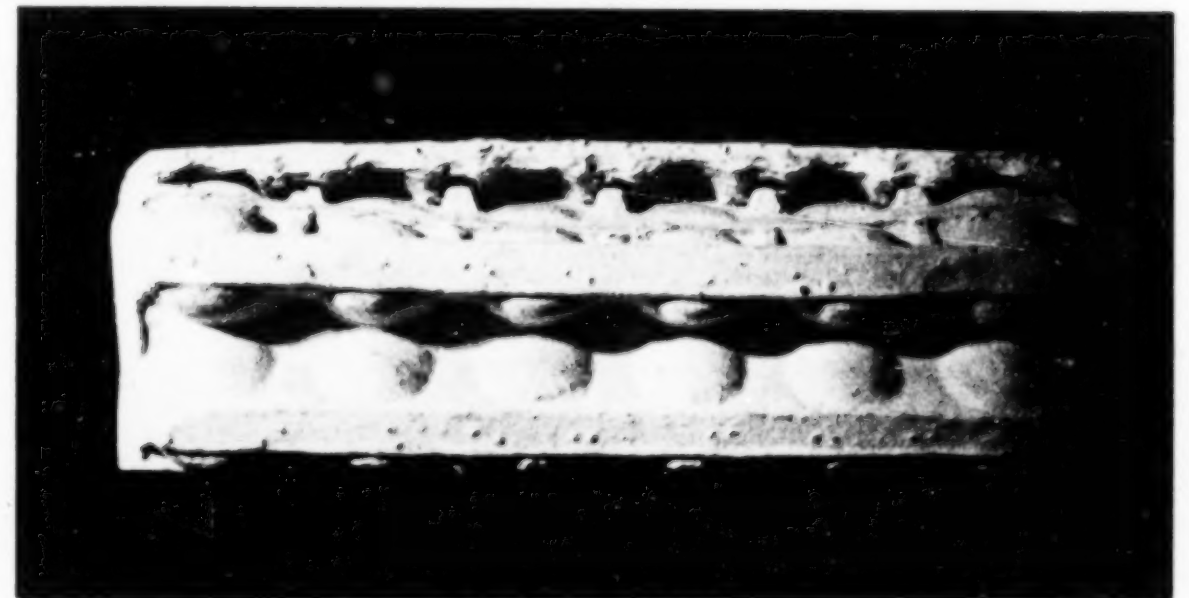
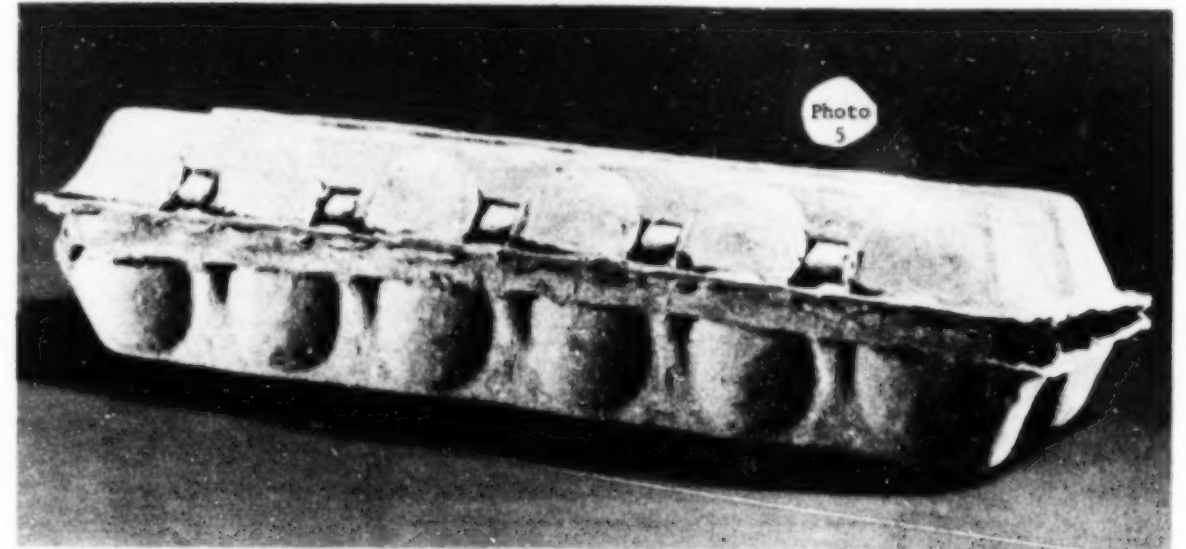
Appendix L

From Defendant's Main Brief Appendix A:

"Photo 5

This photograph of DX 94 corresponds generally to Photo 2 hereof but with the carton in the fully closed and locked position. This photograph is presented for comparison to the Reifers patent in suit."

[Underlining Added]



DX-94

This photograph of DX 94 was taken by plaintiff from a different angle.

Both photographs show the "bow" of the hinge line corresponding to partial collapse of front wall of the flap bearing member. The buttons do not and cannot make a satisfactory lock. Further pressure from outside the carton on the member provided with holes would only push the buttons in.

Case A.
John W. Tuttle's
Imp. Picking Box.

117349

EXTENDED JUL 25 1871

Fig 1

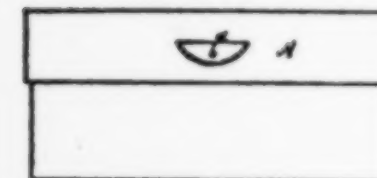


Fig. 2

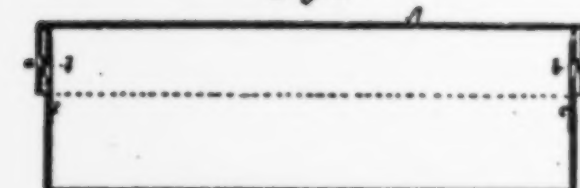


Fig. 3



Fig. 4



Witnesses
S. H. Piper
L. A. Miller

John W. Tuttle
by his attorney
R. H. Day

UNITED STATES PATENT OFFICE.

JOHN W. TUTTLE, OF NEWTON, MASSACHUSETTS.

IMPROVEMENT IN PASTEBOARD PACKING-BOXES.

Specification forming part of Letters Patent No. 117,349, dated July 25, 1871.

To all whom it may concern:

Be it known that I, JOHN W. TUTTLE, of Newton, of the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Paper or Pasteboard Packing-Boxes; and do hereby declare the same to be fully described in the following specification and represented by the accompanying drawing, of which—

Figure 1 denotes an end view, and Fig. 2 a longitudinal section of a packing box and cover provided with my invention. Fig. 3 is an end view of the cover; Fig. 4, an end view of the box or body part thereof.

In carrying out my present invention I form each end or side of the cover A with a segmental slot or opening, *a*, going through it. I also construct the body of the box, at each of the opposite ends or sides, with similarly-shaped projections *b b*, which may be formed by making areal cuts through the end or side of the box and bending outward on their chords the segments included within such areal cuts. A thin covering, *c*, of cloth or paper, may be pasted over each of such segmental openings in the ends or sides of the body, so as to close the opening; and, if desirable, there may be a stuffing of paper or otherwise introduced between the covering and the part cut and pressed out, the stuffing being to fill the space between the two. I generally prefer to dispense with the paper covering and the stuffing, and to leave the projecting part *b* flexible, or with its inherent elasticity, in order to enable it to be pressed inward when necessary. The segmental holes in the cover and the segmental projections of the body of the box are to be so arranged that, on pulling the cover on the body, the projections may be caused to enter the holes and with them serve to hold the cover in place on the body. By pressing inward the end or side of the box where such a projection may be, the latter may be forced out of its hole in the cover, so as to allow of the cover being easily removed from the body.

The object or purpose of my additions to the common pasteboard box is to dispense with the employment of strings, fastenings, or wrappers, such as ordinarily used, or are commonly employed by packers or others, for confining the covers to the bodies of packing boxes.

Common pasteboard packing boxes, as generally made, and as used by manufacturers, or in stores or elsewhere, for the package or preservation of small wares or light articles of merchandise, are very liable to have their covers displaced from the bodies. As a consequence this necessitates the employment of strings or other fastenings going wholly or partially around the boxes; such methods of confining the covers in place being oftentimes expensive and attendant with loss of time and material, which by my invention are saved; and, furthermore, my invention saves the labor and time required for relieving the covers of such means or methods of retaining them in place, and is a valuable and very important improvement, as, for all ordinary purposes, the cover will be kept in place without the necessity of being wrapped or tied down upon the body.

In some respects my present invention is analogous to that for which Letters Patent No. 101,546, dated April 5, 1870, have been granted to me. It differs therefrom, however, in having the segmental cuts or holes made through the sides or ends of the cover, and to operate with the segmental projections formed on the body, as set forth. I herein make no claim to the subject of such patent.

What I claim as my present invention is—

The improved pasteboard packing-box, as provided with slots arranged through the sides or ends of its cover, as described, and with corresponding projections to enter such, arranged and formed on or from the body, as set forth.

JOHN W. TUTTLE.

Witnesses:

R. H. EDDY,
J. R. SNOW.

BEST COPY AVAILABLE

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 1.

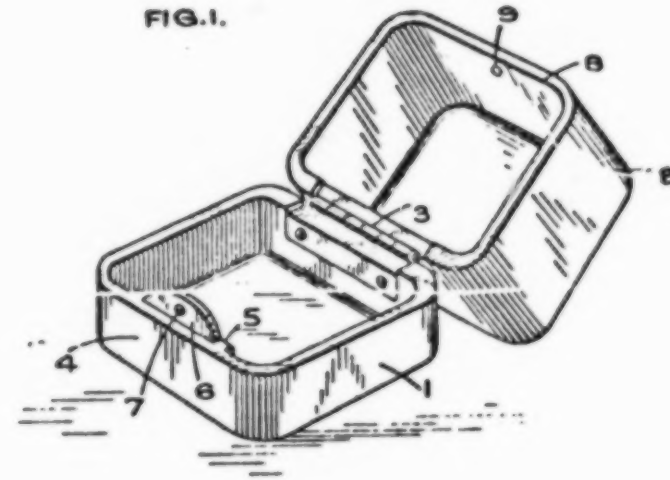


FIG. 2.

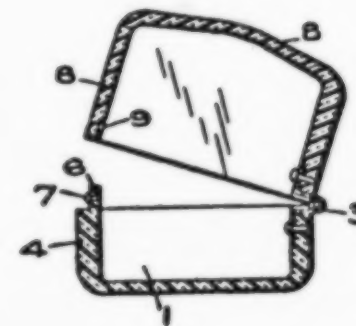
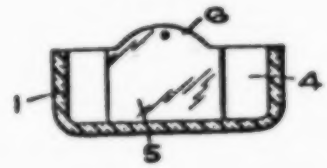


FIG. 3.



Maly & Sons, Photo-Litho

PATENT SPECIFICATION

Application Date: May 11, 1933. No. 13,680/33.

406,159

Complete Accepted: Feb. 22, 1934.

COMPLETE SPECIFICATION.

Improvements in Boxes or Cases for Jewellery or other Light Articles.

We, HERBERT STUDDY HOOPER, and HENRY JAMES WHITEHOUSE, both Subjects of the King of Great Britain, and both of 32, Frederick Street, Birmingham 1, in the County of Warwick, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to boxes or cases for jewellery and other light articles and of the type having a body to which a lid is hinged, a fastening being provided usually including a projection associated with the one part which can be sprung into engagement with the other part.

It has been proposed to construct a metal box or case with a fastening including a resilient tongue or catch integral with one part and adapted for engagement with the other part to retain the lid in the closed position.

It has also been proposed to form moulded boxes with one or more moulded integral projections on one part, each adapted for engagement in a recess in, or with the overhanging edge of, the other part, to retain the hinged lid or the two box parts in the closed position.

The object of the present invention is to provide an improved or modified construction.

According to one aspect of this invention we provide a moulded box or case of the type set forth for jewellery or other light articles, comprising two parts hinged together one of the parts having a resilient portion moulded integrally therewith, such portion being provided with a metal catch for engagement with a co-operating portion of the other of said parts of the box or case.

According to a further aspect of the present invention we provide a moulded box or case of the type referred to for jewellery or other light articles and having an upstanding tongue or the like formed integrally with one part, said tongue carrying a metal catch or projection for engaging the other part to retain the lid in the closed position.

The body or lid may be made for example, from synthetic resin, and on one

of these and at the edge which is disposed opposite to the hinge, an integrally upwardly projecting resilient tongue may be formed, the said tongue carrying a metal rivet or projection adapted to engage in a recess in the other part of the box when the box is closed.

In order that our invention may be clearly understood and more readily carried into practice, we have appended hereto one sheet of drawings illustrating the same, wherein:—

Figure 1 is a perspective view showing one form of our invention.

Figure 2 is a sectional side view.

Figure 3 is a sectional end view.

In the construction illustrated, the box comprises a body 1 and a lid 2 connected by a hinge 3. The parts 1 and 2 may be produced by a moulding of synthetic resin.

The side 4 of the body 1 which is opposite to the hinge 3 has its centre part 5 thickened and provided with an upwardly projecting integral tongue 6 in which is fixed a pin having a projecting head 7.

The material of the tongue 6 is relatively thin and somewhat resilient.

The side 8 of the lid 2 opposite to the hinge 3 is provided with a recess 9 which, when the box is closed, is sprung over the projecting head 7 so that the box is retained closed.

The combined resiliency of the tongue 6 and the side 8 of the lid is sufficient to enable the box to be opened and closed by the exercise of a little pressure.

In the drawings the invention is shown as applied to a box for containing a ring, but it is to be understood that it can be applied to boxes of all other shapes and proportions for containing jewellery or other light articles.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A moulded box or case of the type set forth for jewellery or other light articles, comprising two parts hinged together one of the parts having a resilient portion moulded integrally therewith,

such portion being provided with a metal catch for engagement with a co-operating portion of the other of said parts of the box or case.

- 5 2. A moulded box or case of the type set forth for jewellery or other light articles and having a projecting tongue or the like formed integrally with one part, said tongue carrying a metal catch or projection immovably associated there-
10 with for engaging the other part to retain the lid in the closed position.

3. A moulded box or case according to Claim 2 wherein the tongue or the like is formed on a thickened portion of the wall of the body of the box and the catch or projection is engageable resiliently

with a recess formed in the interior of the lid.

4. A moulded box or case according to Claim 1 or 3 wherein the projection comprises the head of a rivet secured in a hole in said resilient tongue.

5. A box or case for jewellery or other light articles, substantially as described with reference to the accompanying drawings.

Dated the 9th day of May, 1933.
FORRESTER, KETLEY & Co.,
Chartered Patent Agents,
Central House, 75, New Street,
Birmingham 2, and,
Jessel Chambers, 88/90, Chancery Lane,
London, W.C. 2.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1934

B. F. MUNZIKER.
CIGARETTE CASE.

APPLICATION FILED MAR. 8, 1920.

1,354,042.

Patented Sept. 28, 1920.

Fig. 1

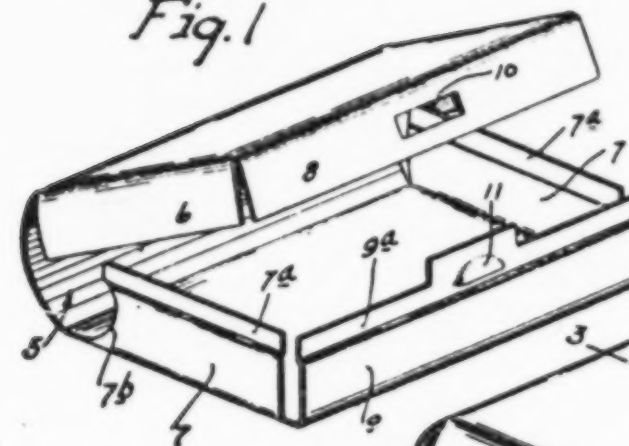


Fig. 2

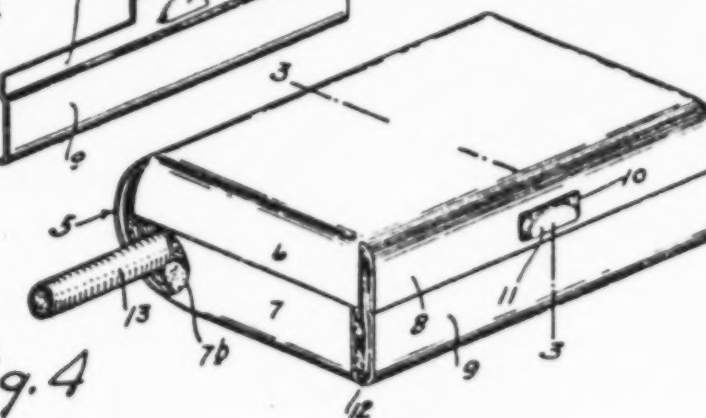


Fig. 4

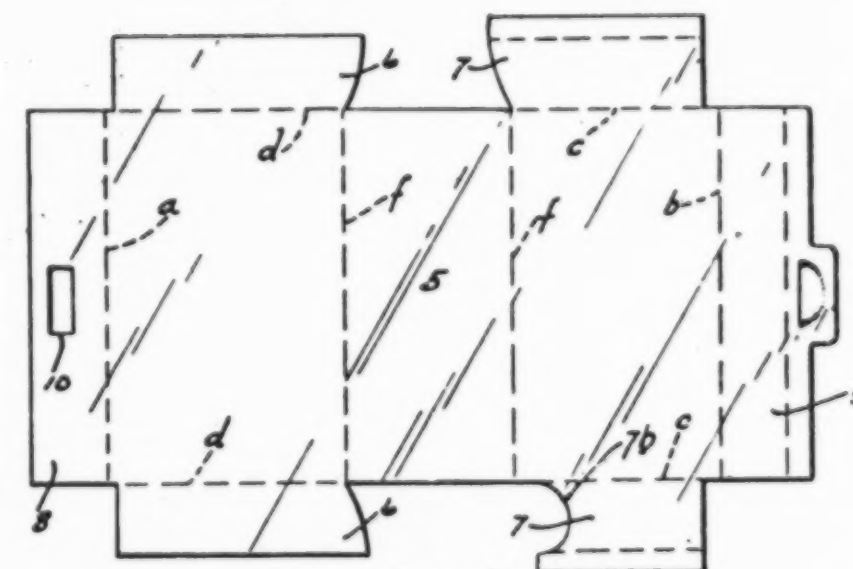
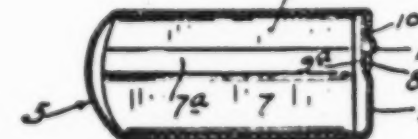


Fig. 3



INVENTOR
Benjamin F. Munziker
BY HIS ATTORNEYS

William H. H. H.

UNITED STATES PATENT OFFICE.

BENJAMIN F. HUNZIKER, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO JULIUS F. HUNZIKER, OF MINNEAPOLIS, MINNESOTA.

CIGARETTE-CASE.

1,354,042.

Specification of Letters Patent. Patented Sept. 28, 1920.

Application filed March 8, 1920. Serial No. 384,057.

To all of whom it may concern:

Be it known that I, BENJAMIN F. HUNZIKER, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Cigarette-Cases; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an extremely simple and highly efficient cigarette case adapted to hold and protect a package of cigarettes and to permit the ready discharge therefrom of the cigarettes, one at a time.

The complete case is made from a single piece of thin sheet metal bent to form an inclosing box-like structure adapted to be opened up by a hinge-like action to permit the cigarette packages to be inserted therein or removed therefrom.

The improved case is indicated in the accompanying drawings wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Figure 1 is a perspective view showing the case opened up;

Fig. 2 is a perspective view showing the case closed and a package of cigarettes therein contained;

Fig. 3 is a transverse section through the case on the line 3—3 of Fig. 2; and

Fig. 4 is a plan view showing the stamped blank of sheet metal before it has been bent to form the case.

Referring first to Fig. 4, the numeral 5 indicates the body of the sheet metal blank, the same being formed with projecting wings 6 and 7 at its opposite edges and with extensions 8 and 9 at its opposite ends. This blank is adapted to be folded on the dotted lines *a*, *b*, *c*, and *d*, to throw, respectively, the end portions 8 and 9 and wings 6 and 7 at approximately right angles to the flat surfaces of the sheet 5. Also, the blank 5 will be slightly bent on lines indicated by the dotted lines *f*, so as to bend the portion between the said lines *f* into something less than a semi-circle, so that the spring wall or portion between the lines *f*—*f* will tend to hold the sides of the case separated or open, as shown in Fig. 1. By

reference to Figs. 1, 2 and 3, it will now be noted that the wings 6 and 7 form the end flanges of the case and that the end extensions 8 and 9 form two cooperating edge forming flanges of the case, while the spring portion between the lines *f*—*f* forms the other edge of the case, the latter being a curved formation. It will also be noted that the edges of the flanges 7 and 9 are slightly inwardly offset at 7' and 9', so that the flanges 6 and 8, respectively, will overlap therewith and stop against the shoulders thus formed when the case is closed, as shown in Fig. 2.

The edge flange 8 is formed with a notch 10, and the offset portion 9' of the edge flange 9 has an outwardly pressed boss 11 that is beveled on its upper side and terminates in a sharp shoulder. When the case is closed, the boss or lug 11 will cam itself into interlocking engagement with the notch 10, and to release the same from the said notch when it is desired to open the case, the flange 9 must be sprung inward by pressure from the fingers.

It will be further noted that all but one of the end forming flanges 6 and 7, at their inner ends, are rounded, so that, in a closed case, they project nearly to the rounded edge of the case and prevent cigarettes from escaping from a closed case; but the inner end of one of the flanges 7 is cut out or notched at 7'', so that it leaves a passage amply large for cigarettes to be dropped or pulled from the case.

In Fig. 2, the numeral 12 indicates a paper package containing cigarettes 13. Before the package of cigarettes is placed in the case, part or all of one end of the paper package 12 is torn off, so that the cigarettes may be discharged, one at a time, from the case.

As is evident, this case will not only hold a package of cigarettes and protect the same from breakage or crushing, but permits the cigarettes to be taken from the case quickly when desired. Obviously, the case is adapted to be carried in the pocket and is but slightly larger than a paper package containing the cigarettes. The facility and ease with which the package of cigarettes can be placed in the case is also evident.

What I claim is:

A cigarette case formed from a single piece of sheet metal bent on a curve at its

1,354,042

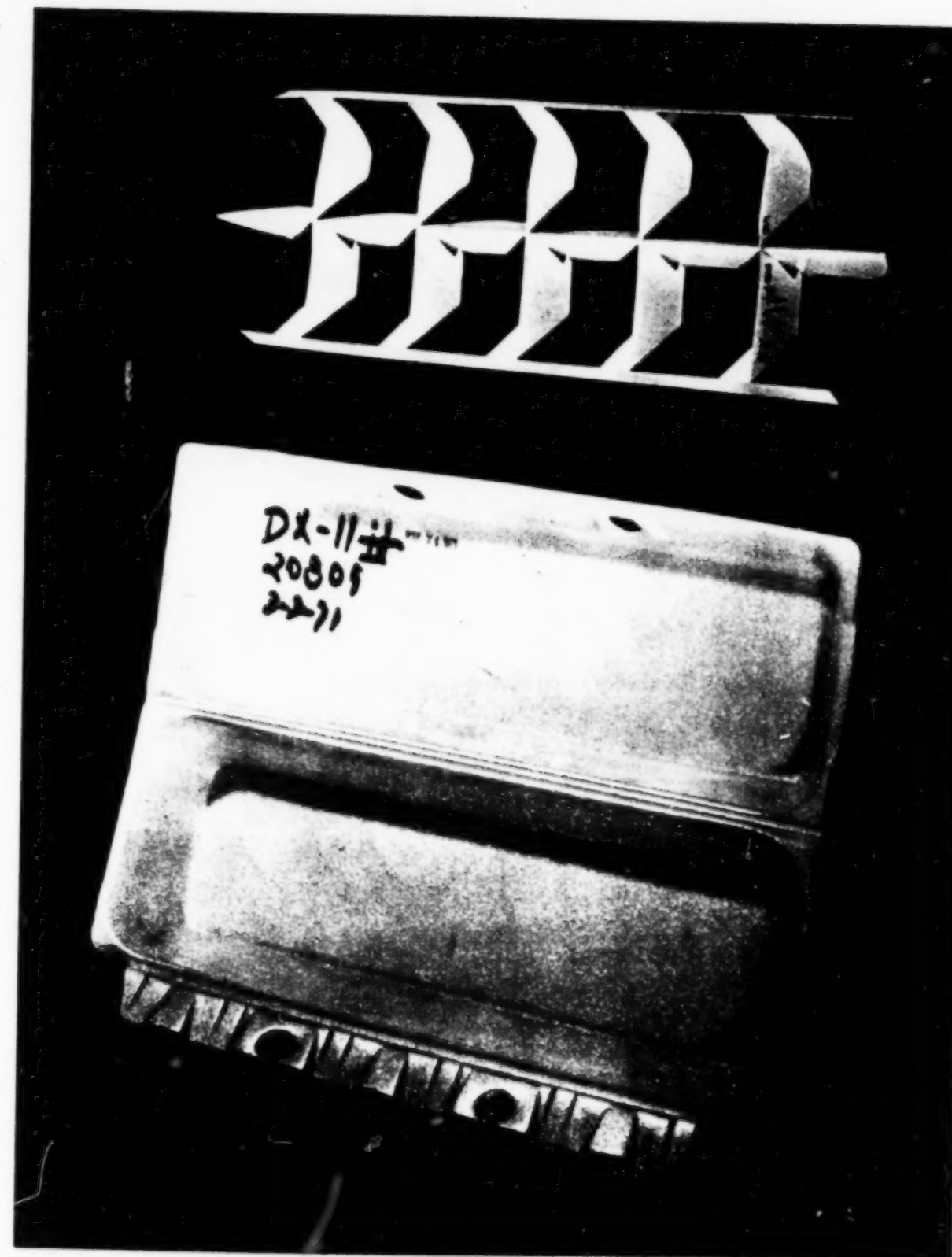
intermediate portion to form a bowed spring acting edge wall, tending to open the case, and with the two sides forming portions of the sheet at their edges and ends having cooperating lapping flanges, said edge forming flanges having yieldingly engaging interlocking elements, and one of said end forming flanges adjacent to the bowed edge of the case, having a passage that is always open when the case is closed, to permit the endwise discharge of cigarettes, one at a time, all of the other edge forming flanges having curved ends located immediately adjacent to said bowed edge of the case, substantially as described. 15

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN F. HUNZIKER.

Witnesses:

J. F. HUNZIKER,
HARRY D. KILOORE.



DX11
AND DX12 USED AT LAWRENCEVILLE DEMONSTRATION
186a

Aug. 27, 1968

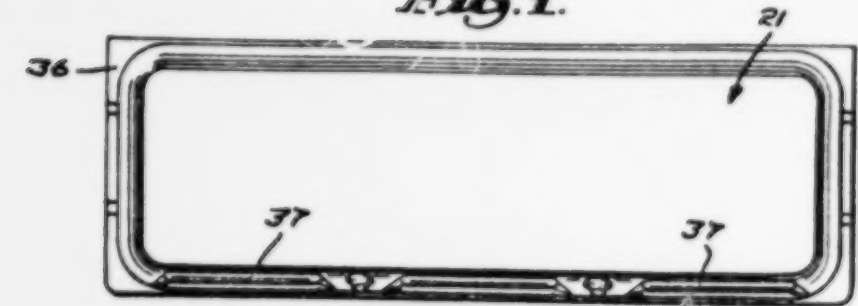
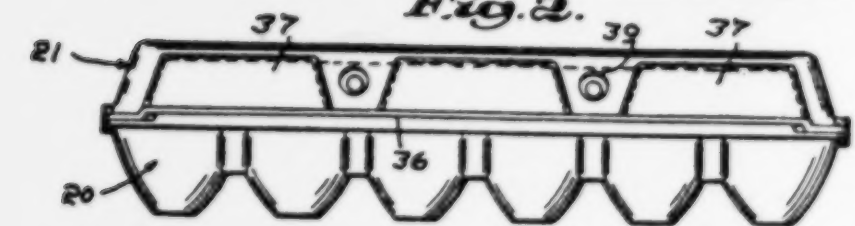
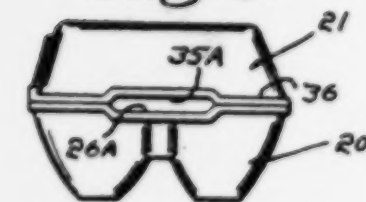
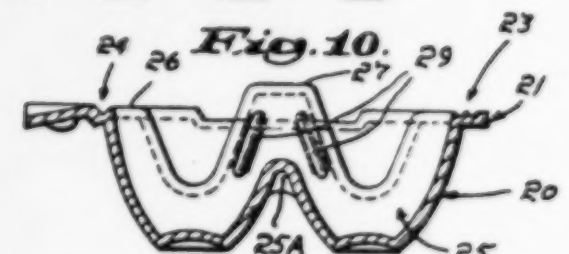
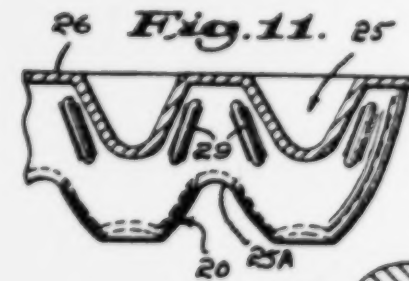
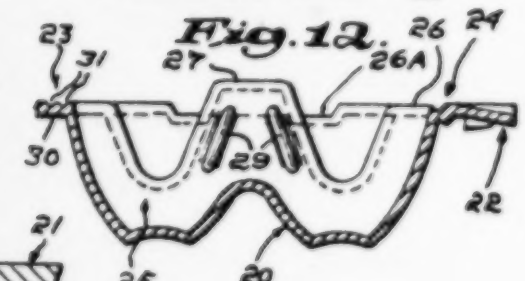
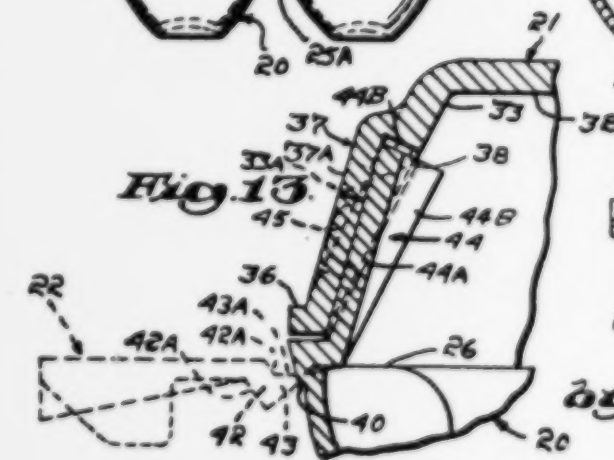
G. A. SNOW ET AL

3,398,875

EGG CARTONS

Filed Dec. 30, 1966

3 Sheets-Sheet 1

Fig. 1.**Fig. 2.****Fig. 3.****Fig. 10.****Fig. 11.****Fig. 12.****Fig. 13.****Fig. 6.**

Inventors:

Gerald A. Snow

Harold A. Doughty

by *Abraham* Attorney

Aug. 27, 1968

G. A. SNOW ET AL

3,398,875

EGG CARTONS

Filed Dec. 30 1966

3 Sheets-Sheet 1

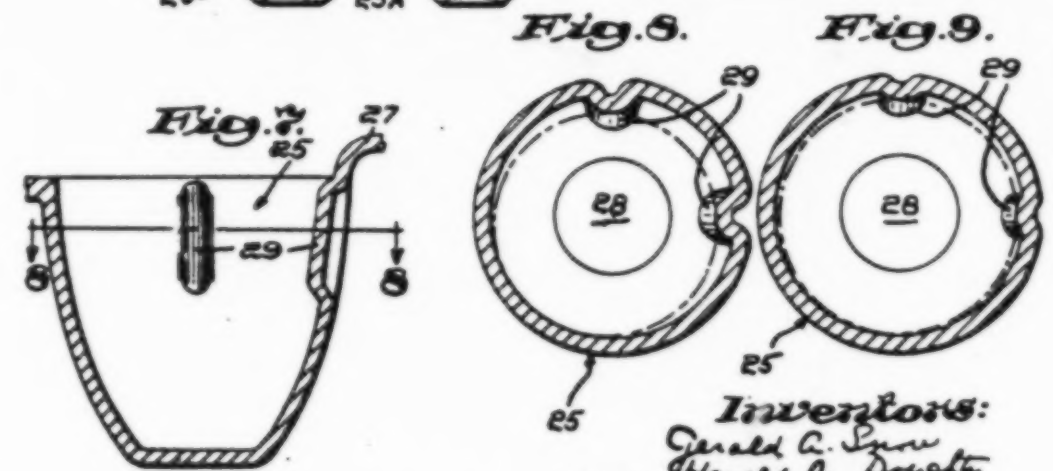
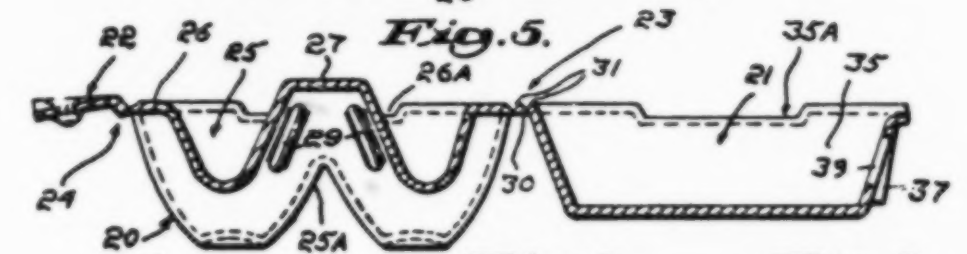
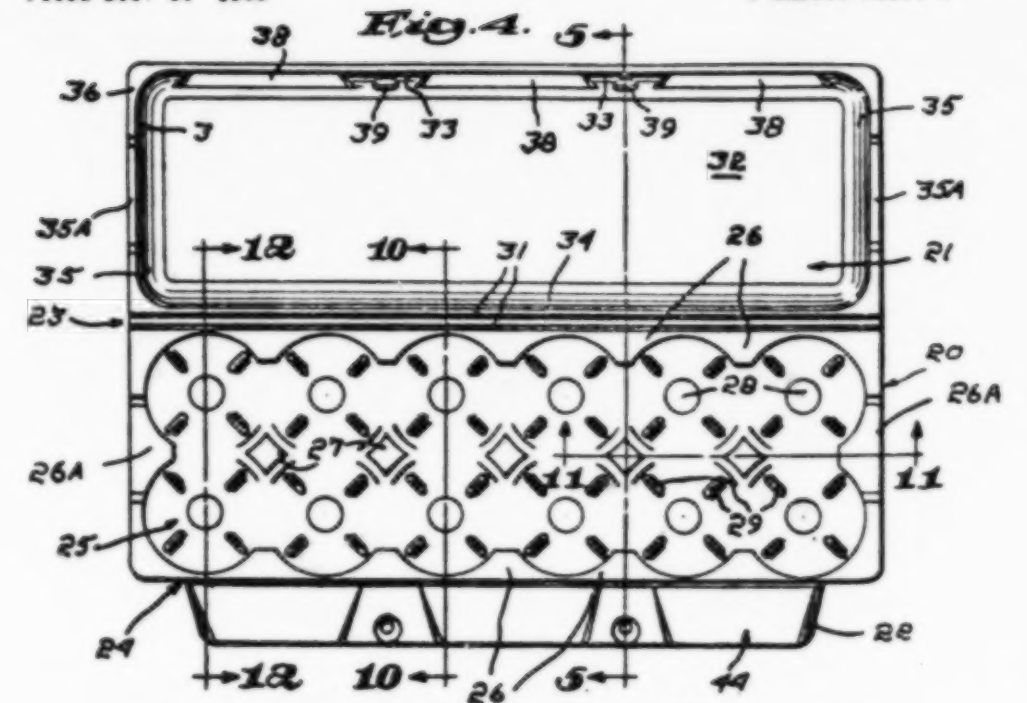
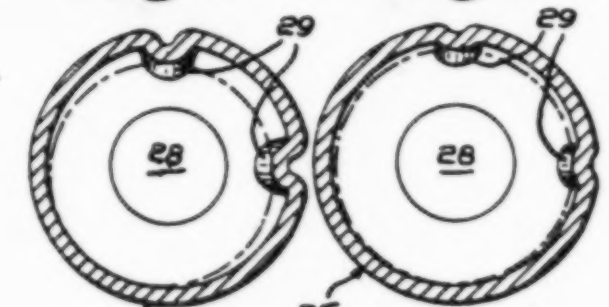


Fig. 8.

Fig. 9.



Inventors:
Gerald A. Snow
Harold A. Doughty
by *Abdullah*
Attorney

Aug. 27, 1968

G. A. SNOW ET AL
EGG CARTONS

3,398,875

Filed Dec. 30, 1966

3 Sheets-Sheet 3

Fig. 14.

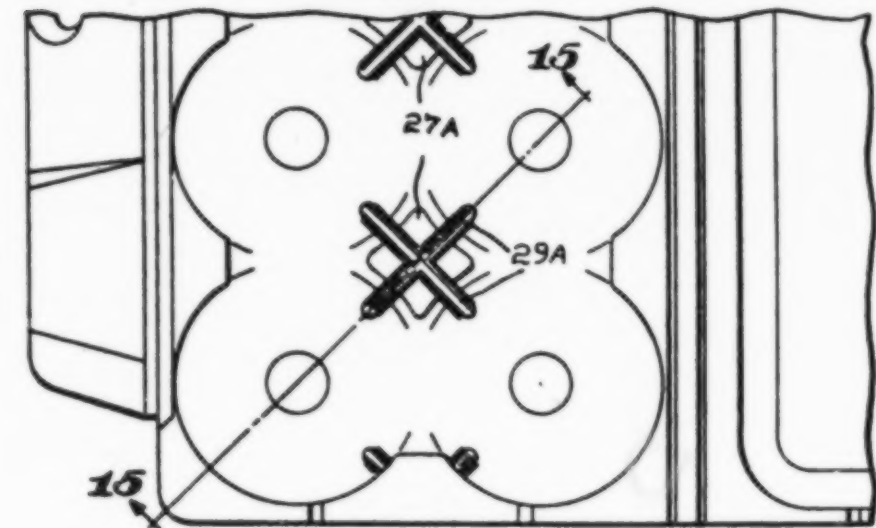


Fig. 15.

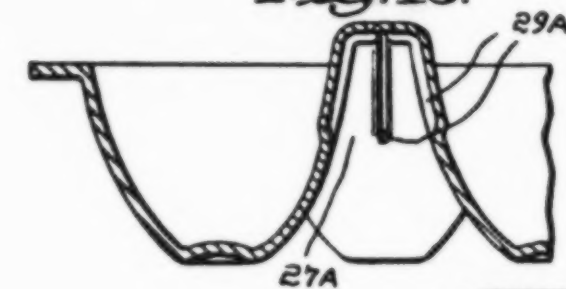
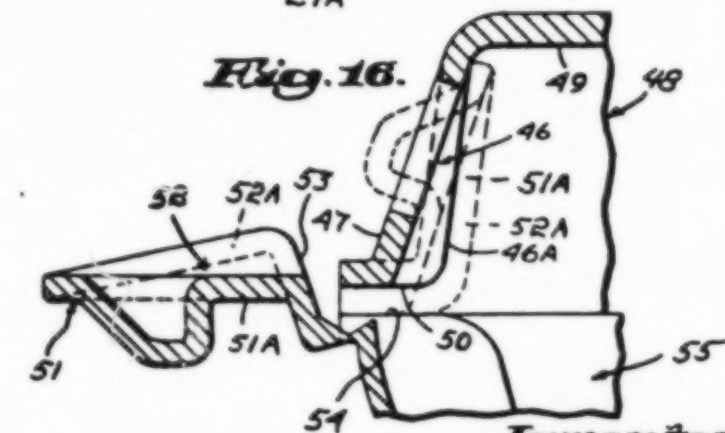


Fig. 16.



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1

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EGG CARTONS

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ABSTRACT OF THE DISCLOSURE

Egg cartons having a cover hinged to the rear edge of a carton bottom and a locking flap hinged to the front edge thereof, the locking flap having a projection which extends through a hole in the front wall of the cover when the flap is positioned to underlie the front wall of the cover when the cover is closed, the flap and cover front wall having vertical channels establishing inner and outer wall portions, one set of wall portions being more nearly vertical than the other set of wall portions, together with a special flap hinge and with a cover front wall having seats internally of the cover front wall engageable by the upper edges of the flap.

The present invention relates to molded containers for articles needing protection of which eggs are but one example and the invention is herein discussed primarily with reference to egg carton embodiments. Cartons for such uses have a bottom formed with egg-receiving pockets, a cover integral with and hingedly connected to its rear edge, and a locking flap integral with and hingedly connected to the front edge of the bottom to fold upwardly and inwardly into an operative position in which it underlies the front wall of the cover when it is closed, the front wall of the cover and the flap including complementary interlocking portions that then become interengaged.

Other special-purpose containers have bottoms formed with article-receiving compartments and covers hingedly connected thereto. When these were formed of material that would otherwise be too flexible, the bottoms and covers have been reinforced by stiffening channels. The covers, when such containers were closed, were supported by the upper edges of the bottom and their edges were also seated on shoulders formed marginally thereof. Releasable means were commonly provided to lock the covers to the front wall of their container bottoms.

Egg cartons are made to nest and have their bottoms and tops of approximately the same depth. When molded from pulp or a plastic of about the same stiffness as pulp, no satisfactory connection directly between the carton bottoms and the covers is practicable. For that reason, locking flaps are used and considerable effort has been directed to the prevention of their becoming disengaged from the covers incidental to the handling and transportation of the cartons. Such locking flaps have also been used to brace the covers adjacent their junction with their front walls in the manner of such other special-purpose containers.

The present invention is concerned with the relationship of the locking flaps to the covers and particularly to the front walls thereof and also both to their connection with and their support by the carton bottoms.

In accordance with the invention, a carton has its locking flap and the front wall of its cover formed with vertically disposed reinforcements in the form of mating channels providing the inner and outer wall portions are so inclined relatively to each other that one set of wall portions is outwardly and downwardly inclined and the

2

other set is more nearly vertical. Adjacent its front edge, the carton bottom includes shelf structure on which a marginal portion of the flap rests with the channel portions that are the more nearly vertical with respect thereto increasing the effectiveness of the reinforcements.

A preferred construction of the invention is to have the reinforcing channels of the front cover wall terminate substantially below its junction with the flat portion of the cover and to so dimension the locking flap that portions of it are engageable by the shoulders established on the interior surface of the front wall of the cover when the cover is closed. A particular objective of the invention is to have such flap portions and the seats with which they are engageable so inclined that downward pressure on the carton cover forces the locking flap and the front cover wall into such mutual contact that ensures that the means interlocking them do not become accidentally released.

Another preferred feature of an egg carton in accordance with the invention is the construction of the hinge integrally joining the locking flap to the carton bottom. In accordance with this feature, the flap has a shoulder provided with a tapering web connecting it with the front portion of the bottom at or adjacent its upper edge and defining the hinge line between it and the locking flap. The flap shoulder and the web include planar, angularly disposed surfaces. The front edge of the carton bottom has shelf structure and an outwardly and downwardly inclined marginal portion against which said planar flap portions seat when the locking flap is operatively disposed.

As problems exist in packing eggs above a predetermined size in any such carton, another objective of the invention is to provide egg-receiving pockets that are self-adjusting to a relatively wide, egg size range. In accordance with the invention, this objective is attained by providing each pocket with a channel that presents an internal, vertical rib within that pocket to be engaged by the egg that is seated therein. The ribs, and there are desirably two for each pocket, are preferably located where the pocket walls are so spaced from each other that the channels may flatten to expand a pocket without affecting any other pocket.

In the accompanying drawings, there are shown illustrative embodiments of the invention from which these and other of its objectives, novel features, and advantages will be readily apparent.

In the drawings:

FIGURE 1 is a top elevation of an egg carton in accordance with the invention,

FIGURE 2 is a front view thereof,

FIGURE 3 is an end view of the carton,

FIGURE 4 is a top elevation of the carton, the carton being shown as opened,

FIGURE 5 is a section taken approximately along the indicated lines 5-5 of FIGURE 4,

FIGURE 6 is a fragmentary section transversely of the hinge connection between the locking flap and the bottom of the carton,

FIGURE 7 is a vertical section, on an increased scale, through an egg-receiving pocket,

FIGURE 8 is a section taken approximately along the indicated lines 8-8 of FIGURE 7,

FIGURE 9 is a view similar to FIGURE 8 illustrating the expansion of the pocket by an egg,

FIGURES 10, 11, and 12 are sections taken, respectively, substantially along the indicated lines 10-10, 11-11, and 12-12 of FIGURE 4,

FIGURE 13 is a fragmentary, vertical section through the locking flap and the front wall of the cover of a closed carton,

FIGURE 14 is a fragmentary view of an open carton

in accordance with another embodiment of the invention, FIGURE 15 is a section, on an increased scale, taken approximately along the indicated line 15—15 of FIGURE 14, and

FIGURE 16 is a view similar to FIGURE 13 but illustrating yet another embodiment of the invention.

The egg carton illustrated by the drawings comprises an egg-receiving and supporting bottom, a cover, and a locking flap, generally indicated at 20, 21, and 22, respectively. The cover 21 and the flap 22 are integrally joined to the back and front, respectively, of the carton bottom 20 by hinges generally indicated at 23 and 24, respectively.

The carton bottom 20 has a plurality of pockets generally indicated at 25, shown as arranged in two parallel rows of six pockets each. The outer portions of the walls of the pockets 25 are interconnected by outwardly extending webs or shelves 26, which establish the plane of the upper surface of the bottom 20 except centrally of its ends where the shelves are depressed as at 26A. Hollow posts 27, projecting above that plane, are so spaced between the two rows that each is common to and forms part of the wall of four pockets 25. Those parts 25A of the pocket walls between the posts 27 and between a post 27 and a shelf 26 or 26A terminate below the plane of the shelves 26. The wall structure 25A is common to two pockets 25 and is in the form of an inverted V. Elsewhere, the walls of adjacent pockets 25 are spaced apart.

Each pocket 25 is to support the lower portion of an egg and is generally egg-shaped but has a convex bottom 28. In order that the pockets 25 may serve to hold and support any egg whose dimensions are within an acceptably wide range, each pocket 25 is provided with a pair of inwardly disposed, vertical ribs 29, each shown as extending part way up each post 27 and, accordingly, spaced about 90° apart. In the case of the pockets 25 at the end of the carton tray 20, a rib 29 of each extends part way up its wall structure in the zone where the corresponding wall structure of two end pockets merge and form a shelf 26A. The ribs 29 are channels of U-shaped cross section with the channels of each row of pockets opening towards the other row. The ribs 29 present downwardly and inwardly inclined straight edges which are shown as terminating substantially above the bottom of each pocket to be engaged by an egg placed therein. While these ribs enable eggs within a substantial "undersize" range to be securely supported, the pocket wall thickness and the nature of the material from which the cartons are molded are such that the ribs 29 yield to effect the enlargement of any pocket that receives an egg whose pocket-entering portion is within a substantial "oversize" range.

A web 30 joins the cover 21 to the rear upper edge of the carton bottom 20, and has a pair of parallel V-shaped cuts 31 which establish the hinge 23. The cover 21 has a flat-surfaced top 32 and integral, outwardly and downwardly sloping front, rear, and end walls 33, 34, and 35, respectively, of a height such that when the cover 21 is in its carton-closing position, there is space for the upper portions of eggs seated in the pockets 25. The cover 21 has a marginal flange 36 and the end walls 35 are recessed as at 35A in a manner such that, when the cover 21 is closed against the bottom 20, the recesses 26A and 35A define slots ensuring ventilation from end-to-end of the carton.

The front wall 33 has a series of vertically disposed, generally indicated channels 37 which serve to stiffen it. In the embodiment of the invention illustrated by the drawings, there are three such channels and these are shown as of substantial width with upwardly and inwardly tapering ends and as tapering upwardly and outwardly from the flange 36 away from the wall 33 and as terminating a substantial distance below the junction of the wall 33 and the top 32 of the cover 21 thus to provide

transversely aligned, internal shoulders or seats 38. In practice, the seats 38 are inwardly and downwardly inclined. Between each two channels 37 there is a locking aperture 39, the apertures being shown as circular. The channels 37 thus provide wall portions 37A that are more nearly vertical than the portions of the wall 33 between them, see FIGURE 13.

The shelves 26 along the front upper edge of the carton bottom 20 include a straight edged narrow outwardly projecting shoulder 40 having its front or outer edge presenting an outwardly and downwardly inclined margin 41, the angle of the margin 41 to the vertical being shown as in the neighborhood of 58°.

The locking flap 22 includes a shoulder 42 extending along its inner edge with the shoulder 42 having a web 43 integrally connected to the shoulder 40 and tapering to define the fold line of the hinge 24. The surfaces 42A and 43A are planar and disposed angularly relative to each other, the angle between them being approximately that defined by the margin 41 and the structure 26. The surface 43A is of approximately the same width as the margin 41 so that when the locking flap 22 is swung upwardly and inwardly into its operative position prior to the closing of the cover 21, the surfaces 43A and 42A engage and are supported, respectively, by the margin 41 and proximate portions of the shelves 26 at the front upper edge of the carton bottom 21. The surface 42B is parallel to the surface 42A and when the locking flap 22 is seated on the outer edge of the carton bottom 20, the surface 42B is parallel to and underlies the front wall 33 of the cover 21 and is engageable thereby when the cover 22 is positioned to close the carton.

The locking flap 22 includes vertically disposed reinforcing channels 44 of the same shape as the channels 37 of the cover front wall 32 and are shown as dimensioned to fit therein. The channels 44 taper downwardly and inwardly from the free end of the locking flap 22 and terminate adjacent the shoulder surface 42B thus to provide outer portions 44A, see FIGURE 13, that are more nearly vertical than the intermediate portions of the flap 22. The upper extremities 44B are engageable with the seats 38 and are so inclined that they interlock and, on downward pressure on the cover 21, the locking flap 22 and the front wall 33 are urged into tight mutually reinforcing relationship with the load favorably distributed relative to the vertical.

The locking flap 22 has locking projections 45, one for each aperture 39 of the cover front wall 33 and extending outwardly therethrough when the cover 22 is in its closed position to hold it against accidental release. The projections 45 do not protrude beyond the plane of the surfaces 37A of the reinforcements 37 which are preferably closely spaced to minimize the chances of the projection being accidentally released from the holes 39. Each locking projection 45, at its base and at its outer end is circular but its upper portion tapers downwardly and outwardly from the upper edge of the flap 22 while its lower portion projects outwardly at right angles to the flap portions 22A.

The embodiment of the invention shown in FIGURES 14 and 15 illustrates the reinforcement of the posts 27A by continuing the channels that establish the ribs 29A in the egg-receiving pockets upwardly along each post 27A and across the top thereof, each reinforcing rib 29A being common to diagonally spaced pockets.

In the embodiment of the invention illustrated by FIGURE 16, a different arrangement of the vertical and tapering channels providing reinforcements of the locking flap and of the front wall of the carton cover is shown.

In the egg carton shown in FIGURE 16, the channels 46 of the outwardly and downwardly inclined front wall 47 of the cover 48 are desirably narrow and project inwardly of and at an angle relative thereto to provide wall portions 46A that are approximately at right angles rela-

tive to the plane of the flat top wall 49 of the cover 48 and provide closed bearing ends 50.

The locking flap 51, while it may otherwise be similar to the locking flap 23, has its vertical, inwardly disposed channels by which it is reinforced, generally indicated at 52 and these are upwardly and inwardly tapered to have mating engagement with the channels 46 of the cover 48 and to provide approximately vertical inner wall portions 52A relative to which the remainder of the flap is outwardly and downwardly inclined when the flap 51 is operatively positioned with its seat 53 resting on the shelf structure 54 of the carton bottom 55 and engageable by the bearing ends 50 when the cover 48 is closed. The flap 51 is shown as having its free edge terminating well below the flat cover wall 49. The flap 52 has locking projections 56 disposed to enter aperture 57 in the front cover wall 47.

Egg cartons in accordance with the invention are well adapted to meet requirements since, once filled and closed, they resist accidental opening during handling and transit.

We claim:

1. A molded carton of the type comprising a bottom including front, rear and side walls and a plurality of article-receiving pockets, a cover including a flat top and depending front, side, and rear walls with at least the front cover wall being outwardly inclined, the rear cover and base walls being integrally and hingedly interconnected, and a locking flap integrally and hingedly connected to the front wall of said base to swing into and out of an upwardly disposed, inwardly inclined operative position in which it is in mutual contact with the rear face of the front cover wall when the cover is in its carton-closing position, said carton being characterized by the bottom including shelf structure extending along the front upper edge of the bottom, the flap including a portion resting on said shelf structure in the operative flap position, the flap and the front cover wall including vertically disposed channels, the channels of the front cover wall commencing adjacent its bottom edge and the channels of the flap commencing adjacent said flap portion, the channels establishing inner and outer sets of wall portions for both said cover front wall and said flap, the wall portions of said inner and outer sets being inclined relative to each other with the wall portion of one set being more nearly vertical than the other, means to lock at least one wall portion of the flap to the corresponding wall portion of the cover front wall, said means comprising a projection on the portion of the flap to be locked and the portion of the cover front wall to be locked having a hole through which the projection extends when the cover is closed with the flap in its operative position, at least some of the flap wall portions of both sets bracing said cover and resisting inward movement of the flap when the cover is in support of a load.

2. The molded carton of claim 1 in which the channels of the front cover wall terminate below the top of the cover to provide a series of longitudinally extending seats and the flap is dimensioned so that upper edges of its outer wall portions are engageable with the seats when the carton is closed.

3. The molded carton of claim 2 in which the seats and seat-engaging upper edges are inclined inwardly and downwardly whereby downward pressure on the cover when the carton is closed urges the locking flap and front cover wall together.

4. The molded carton of claim 1 in which the outer wall portions of the front wall of the cover and of the locking flap are the more nearly vertical wall portions, the channels of the front wall of the cover terminate below the junction of the front wall of the cover and the top thereof to provide internal longitudinally extending seats, and the upper edges of the outer wall portions of the locking flap are engageable with the seats when the carton is closed.

5. The molded carton of claim 1 in which the inner wall portions of the front wall of the cover and of the locking flap are the more nearly vertical wall portions and, the lower ends of the channels of the flap define seats engageable by the lower ends of the channels of the front wall of the cover.

6. The molded carton of claim 1 in which the aperture is circular and the projection is circular at its extremities and includes outwardly and downwardly tapering upper portions and a lower portion that is straight.

7. A molded carton of the type comprising a bottom including front, rear and side walls and a plurality of article-receiving pockets, a cover including a flat top and depending front, side, and rear walls with at least the front cover wall being outwardly inclined, the rear cover and base walls being integrally and hingedly interconnected, and a locking flap integrally and hingedly connected to the front wall of said base to swing into and out of an upwardly disposed, inwardly inclined operative position in which it is in mutual contact with the rear face of the front cover wall when the cover is in its carton-closing position, said carton being characterized by said bottom including a horizontal shelf structure and an outwardly and downwardly inclined margin along its front edge and said locking flap including a shoulder and a tapering web integrally connecting said shoulder and the front portion of said bottom and defining with said front portion a fold line enabling said flap to be swung into and out of said upwardly disposed operative position, said flap shoulder and said web including planar portions then engaging, respectively, said inclined margin and shelf, and the opposite face of said flap shoulder being parallel to said shoulder and then being engageable by the bottom edge of said front cover wall.

8. The molded carton of claim 1 in which the wall portions of the flap and cover front wall to be interlocked are inner wall portions.

9. The molded carton of claim 1 in which the wall portions of the flap and cover front wall to be interlocked are outer wall portions.

10. The molded carton of claim 1 in which the channels of the front cover wall terminate short of the junction of the front cover wall with the cover top wall and the locking aperture of the front cover wall is in an inner wall portion and is located below the upper ends of the channels.

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